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The Performance of Secondary Equity Offerings on the Johannesburg Stock Exchange

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A research report submitted to the School of Economic and Business Sciences, Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment (50%) of the requirements for degree of Master of Commerce in Finance.

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DECLARATION

I, Jesse Alves Da Cunha, declare that this research report is my own unaided work. It is submitted in partial fulfilment of the requirements for the degree of Master of Commerce in Finance at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other university.

Signed: _____ Date: _____

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DEFINITION OF KEY TERMS

Abnormal return: The return earned by a security or a portfolio of securities that is unexplained by the risk loadings of a particular risk model (McClelland, 2014).

Agency costs: The loss of shareholder value resulting from the conflict of interests between managers and shareholders that arises when the control and ownership of a firm are separated (Jensen & Meckling, 1976).

Behavioural models: Financial models that investigate the psychological and sociological characteristics that influence the decision-making process of market participants, which in turn influences the stock market (Ricciardi & Simon, 2000).

Beta: A measure of a share's price sensitivity to changes in the market portfolio (McClelland, 2014). The market portfolio is proxied by the JSE All Share Total Returns index.

Equally-weighted approach: A method of measuring the performance (or return) of a portfolio, where the return on every security in the portfolio is given the same weighting.

Issuing firms: Firms that conduct seasoned equity offerings, also referred to as SEO firms in the context of this study.

JSE: The Johannesburg Stock Exchange.

Market capitalisation (size): A firm's market price per share multiplied by the number of shares outstanding.

Market efficiency: The extent to which share prices reflect all available information (Fama, 1970).

Market-to-book ratio (M/B): The market capitalisation of a firm divided by the firm's book value of equity.

Mixed security offering: The simultaneous issuing of two or more types of securities.

Rational models: Financial models that centre on the idea that market participants behave rationally and that investor behaviour is explained by a risk-return framework (Ricciardi & Simon, 2000).

Rights offers: The offering of new shares to existing shareholders, usually at a discounted price.

Secondary equity offering (SEO): The issue of new shares by a listed firm.

SEO Firms: Firms that conduct SEOs, also referred to as issuing firms in the context of this study.

Size-matching procedure: The method of matching an issuing firm to a non-issuing firm that is closest in size.

Style-matching procedure: The method of matching an issuing firm to a non-issuing firm that is in the same size decile and that has the closest market-to-book ratio.

The Capital Asset Pricing Model (CAPM): A model used in the pricing of risky securities that describes the relationship between risk and return (Sharpe, 1964).

The capital structure decision: The choice faced by managers in deciding on whether to finance their firm's operations with either debt or equity (Myers, 1984).

The new issues puzzle: A well-documented phenomenon describing the long-run underperformance of SEO firms in comparison to similar, non-issuing firms.

The market timing theory: A theory that describes the incentives for managers to attempt to time the market by issuing debt or equity when it is overvalued (Baker & Wurgler, 2002).

The risk-return framework: A rational explanation, that stems from modern portfolio theory, for describing the returns of a security as a function of its risk. *Ceteris paribus*, a security that has a higher risk should earn a higher return (Sharpe, 1964).

Tobin's Q-ratio: The market value of a firm divided by its replacement costs, commonly used in literature as a proxy indicating the quality of the firm's investment opportunities (Kim & Weisbach, 2008).

Value-weighted approach: A method of measuring the performance (or return) of a portfolio, where the return on every security in the portfolio is weighted according to that security's relative market capitalisation.

ABSTRACT

International studies have widely documented the long-run underperformance of firms conducting secondary equity offerings (SEOs), a phenomenon commonly referred to as the 'new issues puzzle'. Understanding the market's reaction to SEOs is vital for managers who are commonly tasked with deciding on how to finance their firm's operations. This study investigates the short-run and long-run performance of firms conducting SEOs on the Johannesburg Stock Exchange (JSE) over the period of 1998 to 2015, by exploring both rational and behavioural models in predicting SEO behaviour. Event-study analysis reveals that the market generally reacts negatively to the announcement of SEOs with a statistically significant average two-day cumulative abnormal return of -2.6%. Using a buy-and-hold abnormal return approach, as well as factor regression analysis to study the long-run share performance of issuing firms, there is no evidence that issuing firms significantly underperform relative to non-issuing firms over a five-year period when testing for abnormal share return performance with the Capital Asset Pricing Model. Furthermore, issuing firms exhibit no consistent signs of operating underperformance in comparison to non-issuing firms over a five-year period. Finally, in evidence contradicting the market timing theory, investor sentiment appears to bear no consistently significant influence on either a firm's decision to issue equity, or on the short-run and long-run performance of SEOs. Overall, the results imply that the long-run performance of SEOs conducted in South Africa is best described by rational explanations centred on the risk-return framework. There is no consistent evidence of any 'new issues puzzle' on the JSE.

1 Introduction

The managers of firms are commonly faced with the imperative decision on which route to navigate in raising finance for their firms. When internal funding is no longer an option, managers are forced to look externally, with the choice between debt and equity weighing heavily on their minds. The choice between debt and equity (henceforth, referred to as the capital structure decision) can best be made when the consequences of selecting either path are fully understood. Over the past decade, much academic attention has been dedicated to studies attempting to elucidate the capital structure decisions that firms undertake.

The popularity of this topic has given rise to other avenues of research inspired by the capital structure literature. In particular, fascinating patterns have emerged from studies focusing specifically on the issuance of equity to the public by already listed firms, commonly referred to as secondary equity offerings (SEOs).

Issuing new shares, despite its commonality and enormous importance, has presented a challenge to the academic institution. In spite of all the existing literature delving into the nuances of the equity issuing process, there remains an air of uncertainty and inconsistency regarding the consequences of issuing new shares. Although clear patterns have emerged to help forge a better understanding of the performance of firms surrounding SEOs, explaining these patterns has been a source of great debate.

A large body of literature has documented that the stock market's reaction to a firm's announcement of a secondary equity offering (SEO) is generally negative (Smith, 1986; Ritter, 2003)[1]. These findings are consistent with the adverse selection model proposed by Myers and Majluf (1984). The adverse selection model, which is widely regarded amongst the existing literature as the conventional explanation for these negative announcement effects, proposes that investors view the decision of a firm to issue shares as 'bad news' about the true value of

[1] Both summarizing a large amount of existing literature, Smith (1986) reports an average two-day abnormal share return of -3.14% for industrial firms following public equity announcements, whilst Ritter (2003) reports an average two-day cumulative return of -2% around the announcement date.

that firm. This is due to the incentives that managers have to issue shares when they are overvalued in order to benefit existing shareholders, at the expense of new shareholders.

Extensive literature has also documented the long-run share underperformance of issuing firms (SEO firms[2]) relative to similar non-issuing firms, igniting widespread debate. For instance, Ritter (2003) reports an average underperformance of issuing firms of approximately 5% per year over the five years following the issuance[3]. These findings are not unique to the United States of America (henceforth US). Levis (1993) and Kang, Kim and Stulz (1999), have documented similar patterns in the investment performance of SEOs in the United Kingdom (henceforth UK) and Japan, respectively.

In addition, literature has documented the long-run operating underperformance of issuing firms. Loughran and Ritter (1997) find that issuing firms demonstrate significant improvement in operating performance prior to issuing SEOs, which is then followed by a substantial post-issue deterioration. McLaughlin, Safieddine and Vasudevan (1996) demonstrate the significant decline in the profitability of issuing firms subsequent to conducting SEOs.

Subsequently, theories have been proposed over the years to try and explain this phenomenon of long-run SEO underperformance that has commonly been referred to as 'the new issues puzzle'[4]. The various explanations for the long-run underperformance of issuing firms can be divided into two broad categories: (1) theories based on rational explanations; and (2) theories based on behavioural explanations.

The most prominent explanation for SEO underperformance, which emerges from behavioural finance, is the market timing theory. In brief and in the relevant context, this theory assumes that managers attempt to time the market by issuing shares when they are overvalued (Baker

[2] Throughout this study the use of the terms 'SEO firms' and 'issuing firms' are interchangeable.
[3] More evidence on long-run underperformance is provided by Loughran and Ritter (1995), Clarke, Dunbar and Kahle (2001), and Lyandres, Sun and Zhang (2005).
[4] A term coined by Loughran and Ritter (1995).

& Wurgler, 2002). Investors are over-optimistic with respect to the firms issuing equity and underreact to the SEO announcement whilst maintaining their biased, over-optimistic beliefs about these issuing firms, which could arguably explain the long-run underperformance of SEO firms (Loughran & Ritter, 1995). This reasoning has a huge implication that investors are sluggish in adjusting their beliefs in reaction to new information, casting doubt on the efficiency of the market if indeed SEO firms underperform for periods extending up to five years following the SEO as a result of investor over-optimism.

On the other hand, rational explanations for SEO underperformance centre on the concept of the mispricing of risk. Put simply, these hypotheses attempt to explain the underperformance of SEOs as a failure of the model specification in capturing risk, hence the failure of said model in explaining returns. The argument here is that the lower returns earned by SEO firms are in response to the lower risk faced by holding the shares of these firms. The difficulty in this argument is that it avoids the burden of proof. Claiming that a model is misspecified or ignoring a relevant risk factor bears more weight when the risk can be identified rather than simply hypothesising the existence of an unknown. However, this burden of proof has not always been ignored.

Eckbo, Masulis and Norli (2000) claim that issuing firm underperformance is merely a reflection of lower levels of systematic risk which is attributed to the lower leverage and increased share liquidity of SEO firms after issuance. Carlson, Fisher and Giammarino (2006) find that issuing firm underperformance disappears when measuring share performance using a dynamic beta approach, where in every month following the issuance the realised beta for that month is used to control for risk.

Despite the importance of understanding the market's reaction to a critical component of a firm's financing activity, the empirical research surrounding the long-run performance of firms conducting SEOs has largely been overlooked in the South African context, with the existing South African literature focusing purely on capital structure decisions or initial public offerings (IPOs).

This study comprehensively tests the short-run and long-run effects of SEOs in the context of the Johannesburg Stock Exchange (JSE) by focusing on the relevant behavioural and rational explanatory models proposed in previous literature. Although these results make a valuable contribution to understanding the capital structure decisions faced by firms, it is important to note that the purpose of this study is not to examine the capital structure decision itself. Instead, the focus is solely on the impact and reasoning behind the decision to issue equity.

Firstly, using regression analysis, this study investigates the decision that a firm faces on whether or not to conduct a SEO. A critical component of these regression models, and this study in general, is the measurement of investor sentiment which is used to test the behavioural theories, specifically in relation to examining any evidence of market-timing inferences. This is accomplished with the use of the investor sentiment index developed by Baker and Wurgler (2006), with adjustments made in adapting the index to the South African context in light of the recent findings of Dalika and Seetharam (2015). *Ceteris paribus*, shares are more likely to experience deviations from fundamentals during periods of high-investor sentiment (Chou & Lin, 2015). Therefore, if managers are attempting to time the market in order to issue overvalued shares, investor sentiment should play a significant role in a firm's decision to issue equity.

The results reveal that investor sentiment plays no significant role in a firm's decision to conduct a SEO. In addition, a firm's prior abnormal share price performance and market-to-book ratio[5], which are two other popular measures used to gauge the over-evaluation of a share's worth, also bear no significant influence on a firm's decision to issue equity. Thus, there is no concrete evidence of managers attempting to time the market when conducting SEOs.

[5] Some studies also refer to the 'book-to-market ratio', which is simply the inverse of the market-to-book ratio. For consistency, the market-to-book ratio is used throughout this study.

Secondly, an event-study is undertaken to study the short-run share performance of firms around the SEO announcement date. In line with the international evidence, a significant negative market reaction is found, with SEO firms experiencing an average two-day cumulative abnormal return of -2.6% in response to the SEO announcement. Further analysis reveals that the market's reaction to the SEO announcement is in no way significantly influenced by investor sentiment, again casting doubt on the predictions implied by the behavioural models put forth in the literature. Moreover, neither the issuing firm's size, market-to-book ratio, Tobin's Q-ratio[6], nor the size of the equity issue relative to the issuing firm's size, significantly influence the market's reaction to the SEO announcement.

Finally, the study investigates the comparative long-run share performance and operating performance of SEO firms *vis-à-vis* their non-issuing counterparts. In order to test the rational explanatory models of SEOs, three measures are used to test the comparative market performance: (1) simple buy-and-hold returns; (2) buy-and-hold abnormal market returns[7]; and (3) buy-and-hold abnormal realised returns as defined by use of the Capital Asset Pricing Model (CAPM)[8]. Operating performance is measured across three accounting ratios: (1) the earnings per share ratio (EPS); (2) the return on asset ratio (ROA); and the return on equity ratio (ROE)[9].

The analysis reveals fascinating results. Although issuing firms typically underperform when using the first two measures of market performance[10], the use of the buy-and-hold abnormal realised returns approach reveals no significant differences between the market performance of issuing and non-issuing firms. This result implies that the variation in returns between issuers and non-issuers is adequately explained by the CAPM.

[6] A firm's Tobin's Q-ratio, the market value of the firm divided by its replacement costs, is commonly used in literature as a proxy for the quality of the firm's investment opportunities (Kim & Weisbach, 2008).
[7] A share's abnormal market return is defined as the difference between the share's actual return and the market's return, where the market's return is proxied by the JSE All Share Total Returns index.
[8] A shares abnormal realised return is defined as the difference between the share's actual return and its expected return, where the expected returns are calculated using the CAPM. For robustness, factor regression models are also used to measure abnormal performance based on the CAPM.
[9] These accounting ratios are discussed in further detail in Sections 3.5.2 and 4.2.3.3.
[10] Henceforth, share price performance and market performance are used as interchangeable terms.

There is also no consistent evidence of any significant differences in the operating performance patterns of issuing firms relative to non-issuing firms. Furthermore, in an overall poor showing for the predictions set forth by the market timing theory, the results fail to provide any consistent evidence that investor sentiment bears any significant influence on either the long-run market performance, or the long-run operating performance of issuing firms.

Overall, there does not appear to be a 'new issues puzzle' in the South African context with the evidence suggesting that the rational, risk-return framework best describes the long-run performance of SEOs. Although the typically negative market reaction to SEO announcements in the short-run seems to be explained by the adverse selection model proposed by Myers and Maljuf (1984), there is no consistent evidence of issuing firm underperformance in the long-run. Therefore, these findings fail to find any substantial support for the predictions set forth by the market timing theory in explaining the long-run performance of SEOs.

1.1 Research Objectives and Rationale

1.1.1 The Research Problem

International literature has widely documented the performance of SEOs in an attempt to better understand the consequences faced by countless firms who decide to finance their firms by issuing new shares. Despite the importance of understanding both the market's reaction to the equity issuance, as well as its effect on the subsequent performance of the issuing firm, this topic of study has widely been ignored in the South African context. This gap in the existing South African research presents an opportunity for this study to make a new contribution to the existing body of knowledge, by comprehensively studying the performance of SEOs conducted on the JSE.

1.1.2 Objectives

The main objective of this study is to examine the short-run and long-run effects of SEOs on the JSE. This study explores the market's initial reaction to the SEO announcement, as well as the long-run financial and operating performance of issuing firms following the announcement.

This study also explores two sub-objectives, ranked by importance:

1. To test both the rational and behavioural models of explaining SEO performance. Specifically, this study tests the rational explanation models by seeing whether long-run performance is sensitive to the various model specifications, and tests the market timing theory explanations (behavioural models) by examining the impact of investor sentiment on the performance of SEOs.
2. To examine the impact of the issuing firm's characteristics, and the details of the SEO announcement, on the market's initial reaction to the SEO announcement.

1.1.3 Rationale

Managers are tasked with making imperative decisions with respect to raising external financing. In order to make these decisions, managers need to be aware of both the direct and the indirect costs of financing, as well as the information conveyed to the market. Understanding the market's reaction to SEOs will aid managers in making their decisions by shedding more light on the indirect costs of issuing new shares (in particular the costs associated with adverse selection and information asymmetries). The interaction between financing and investing decisions make these concepts vital for managers to understand.

As aforementioned, the lack of research conducted in South Africa with regards to SEOs serves as added motivation and further highlights the importance of this study. Additionally, the inclusion of a robust measurement of investment sentiment in this study raises the prospect of interesting and unique observations with regards to the field of behavioural finance and its ability to explain SEO performance.

Finally, on a broader scale, the results of this study has implications on the level of market efficiency in South Africa. The ability of managers to time the market would provide evidence against strong-form market efficiency[11] and the persistence of long-term irrational trends would

[11] Strong-form market efficiency implies that all information, both private and public, is already reflected in current share prices (Fama, 1970). Thus, the ability of managers to successfully time the market would contradict strong-form market efficiency as it implies that managers have superior material information regarding the firm, which is not reflected in the share price.

raise further doubt about the market's efficiency. Hence, the findings of this study, which fails to find support for the market timing theory, also fails to provide any evidence against the strong-form efficiency of the JSE. There is no evidence of managers attempting to time the market when conducting SEOs on the JSE, nor is there any evidence of SEO underperformance in the long-run that would suggest any irrational long-term investor behaviour.

1.2 Hypotheses

1.2.1 Primary Hypotheses

The main aim of this study is to test the short-run and long-run performance of issuing firms following the announcement of the SEO.

The first part of this study tests the announcement effects associated with SEOs:

- *$H_{1,0}$: There are no significant two-day average abnormal share returns following SEO announcements.*
- *$H_{1,A}$: There are significant negative two-day average abnormal share returns following SEO announcements*[12].

Secondly, by using different measures of testing for share price and operating performance, the following hypothesis is tested:

- *$H_{2,0}$: Issuing firms do not significantly underperform (or outperform) in comparison to their non-issuing matching firms over a five-year period*[13].
- *$H_{2,A}$: Issuing firms do significantly underperform in comparison to their non-issuing matching firms over a five-year period.*

1.2.2 Secondary Hypotheses

The secondary focus of this study is to analyse the influence of investor sentiment on the decision to conduct SEOs, the market's reaction to the SEO announcement, and the long-run

[12] All the alternative hypotheses (H_A) represent the hypothesised relationships that are consistent with the SEO literature as discussed in Chapters 2 and 3.
[13] Henceforth, comparative performance is also tested over 1-year and 3-year periods.

performance of SEO firms. These hypotheses refer to the behavioural explanations of SEO performance with a particular focus on the market timing theory:

- *$H_{3,0}$: The probability of a firm conducting a SEO is not significantly influenced by investor sentiment.*
- *$H_{3,A}$: Firms are significantly more likely to conduct SEOs during periods of high-investor sentiment.*

- *$H_{4,0}$: Investor sentiment does not significantly influence the market's reaction to SEO announcements.*
- *$H_{4,A}$: Firms that conduct SEOs during periods of high-investor sentiment, experience significantly less negative abnormal returns following the announcement.*

- *$H_{5,0}$: Investor sentiment does not significantly influence post-issue underperformance over a five-year period.*
- *$H_{5,A}$: Firms that conduct SEOs during periods of high-investor sentiment, experience significantly worse post-issue underperformance over a five-year period.*

1.2.3 Tertiary Hypotheses

Finally, this study aims to investigate the influence of the explanatory variables that could potentially impact the market's initial reaction to SEO announcements, by testing the following hypotheses:

- *$H_{6,0}$: The quality of a firm's investment opportunities does not significantly influence the market's reaction to SEO announcements.*
- *$H_{6,A}$: Firms with a higher quality of investment opportunities experience a significantly less negative market response to SEO announcements.*

- *$H_{7,0}$: The size of the share issue (relative to the size of the firm issuing shares) has no significant influence on the market's reaction to SEO announcements.*
- *$H_{7,A}$: Larger share issues (relative to the size of the firm issuing the shares) will experience a more significantly negative market response to SEO announcements.*

- *$H_{8,0}$: The characteristics of the issuing firm (namely size and age) have no significant influence on the market's reaction to SEO announcements.*
- *$H_{8,A}$: Younger, smaller firms will have a more significantly negative market response to their SEO announcements*[14].

The remainder of the study proceeds as follows: Chapter 2 discusses the relevant literature surrounding SEOs; Chapter 3 extends the literature discussion to motivate the empirical framework undertaken in this study; Chapter 4 sets out the methodology employed, with the results discussed in Chapter 5; and Chapter 6 concludes the study.

[14] Similar to the work of Chou and Lin (2015), the age of a firm is be proxied by the number of years that the firm has been listed on the JSE.

2 A Review of the Literature

The literature review is divided into four main sections. The first section briefly describes the capital structure theories, a widely-documented avenue of research that has since gone on to inspire the development of the SEO literature. The second section describes the literature documenting the market's short-run response to the announcement of SEOs, commonly referred to as 'announcement effects'. The third section focuses on the long-run financial and operating performance of SEO firms post-issue, with the relevant literature further divided into rational and behavioural explanations for SEO long-run performance. The fourth section, briefly touches on the relevant South African literature, bearing in mind the virtual absence of research in South Africa that focuses specifically on SEOs.

2.1 Capital Structure Theories

This section briefly discusses the capital structure literature with the aim of providing the full background of the academic environment which has inspired the avenue of research focusing solely on SEOs. After all, it is the capital structure literature that has gone on to inspire the SEO literature. The foundation was set by the seminal contribution of Modigliani and Miller (1958) who famously claimed that in perfect capital markets, a firm's total value is completely independent of its capital structure. Therefore, any attempt to benefit from switching between debt and equity or *vice versa*, is in vain. According to their findings, the choice between debt and equity is irrelevant as it does not impact a firm's value.

However, in reality capital markets are not perfectly efficient and two major theories have since emerged in order to describe the crucial capital structure decisions that firms must make: the trade-off theory; and the pecking-order theory. The trade-off theory argues that a firm's optimal capital structure is decided by balancing the benefits derived from the use of debt, such as its tax advantages, with the disadvantages associated with firms being highly levered, such as the risk and costs associated with financial distress.

The pecking order theory argues that there is a hierarchy associated with the choice of financing, based on the cheapest source of available financing. In consideration of the information costs, firms should prefer internal funds to the use of external funds and in the event that external funds are required, firms should prefer debt to equity financing (Myers, 1984).

Unfortunately, the evidence surrounding these two theories is not promising, as both these theories are plagued by inconsistencies across the existent empirical literature[15]. Despite the various other capital structure theories that have been developed over the years, a comprehensive theory explaining capital structure decisions is yet to be discovered as this 'puzzle' remains unsolved (Barclay & Smith, 1999).

2.2 Announcement Effects (The Short-run Effects of SEOs)

Faced with the puzzle that is the capital structure decision, authors began to pay more attention to studying the market's reaction to SEOs in more detail. The literature has since revealed some fascinating patterns. Smith (1986), using the data from several previous studies, examined the market's reaction to the announcement of SEOs and found an average two-day abnormal share return of -3.14% for industrials, and -0.75% for utilities. Ritter (2003), also making using of several prior studies, found an average two-day cumulative return of approximately -2% around the announcement date.

The adverse selection model developed by Myers and Majluf (1984), appears to be the most commonly cited explanation by academics in explaining these negative announcement effects (Ritter, 2003). Their model, which focuses on information asymmetries between managers and investors, argues that managers are better informed than investors with respect to the true value of the firm's assets and its growth opportunities. Therefore, in the interest of existing shareholders, managers will only issue equity when they believe that their equity is overvalued.

[15] Barclay and Smith (1999) document the empirical inconsistencies of both the trade-off theory and the pecking-order theory.

Rational investors are aware of the manager's incentives and therefore interpret the announcement of share issues as 'bad news' about the firm's intrinsic value (Pilotte, 1992).

This explanation does raise a serious challenge to strong-form market efficiency as there is overwhelming evidence that managers do indeed attempt to time the market, with the incentive to issue equity when it is overvalued. Baker and Wurgler (2002) report that a firm's capital structure is significantly related to previous market valuations, which implies that a firm's capital structure is a result of its cumulative past attempts to time the market.

In a survey conducted by Graham and Harvey (2001), approximately two-thirds of chief financial officers (CFOs) admitted that the relative over- or under-valuation of a share is a vital consideration in their decision to issue equity. There is also evidence of managers attempting to time volatility in an attempt to issue shares during periods of low market volatility (Carlson, Fisher & Giammarino, 2006).

These findings are in line with the extensive body of research documenting the increase in share issuance activity during periods of high market valuations (Jung, Kim & Stulz, 1996). It would make logical sense that the preferred environment to issue shares is during robust market conditions. DeAngelo, DeAngelo and Stulz (2010) find a significant relationship between the probability of conducting a SEO and common measures of mispricing such as pre-issue abnormal returns, market-to-book ratios, and the age of a firm. However, measuring the correct fundamental value of a share is subjective and another catalyst for wide-spread debate. Hence, measures of investor sentiment are fast becoming the popular choice for gauging market conditions.

Chou and Lin (2015) find that the probability of a firm conducting a SEO is positively related to investor sentiment, as measured using the investor sentiment index developed by Baker and Wurgler (2006). Not only are firms more likely to issue shares during periods of high-investor sentiment, but they also experience less negative announcement effects when announcing the SEO during periods of high-investor sentiment. It is argued that investors become overly

optimistic during these periods of hyped sentiment, bidding share prices upwards and causing deviations from fundamental values which creates incentives for managers to issue equity in an attempt to time the market. This investor over-optimism also explains why investors are reacting less negatively to SEO announcements during periods of high-investor sentiment. This weakened negative response during high-investor sentiment periods might even create additional incentives for manager to issue shares during these periods, in addition to the incentive already created by the potential overvaluation of their firm's equity.

Not all announcements of equity offerings are interpreted as 'bad news' by the market. The interaction between financing and investing decisions is also a vital consideration, as the announcement of an equity issue can convey multiple facets of information. Not only does it convey information about the possible intrinsic value of the firm, but it also implies that the firm will make use of the funds in its operations (Ritter, 2003). Bridging the 'information gap' between investors and managers should influence the market's reaction to SEO announcements.

If investors believe that the cash raised from the equity issue will lead to the firm investing in a project that will add value to the firm, then the announcement effect could be positive or by extension, less negative. Empirical evidence does suggest that there is a less negative reaction to an equity issuance when firms can convince investors that there is a good reason for issuing the equity (Ritter, 2003). Jung, Kim and Stulz (1996) provide evidence that firms with a high Tobin's Q-ratio have announcement effects that do not significantly differ from zero. In contrast, Barclay and Litzenberger (1988) fail to establish any significant relationship between announcement effects and either the Tobin's Q-ratio or the intended used of funds.

Korajcyzk, Lucas and McDonald (1992), find evidence that the announcement effects associated with equity issues are less negative when the announcement is made shortly after an earnings report is issued, arguing that during this time period, there is less information asymmetry. Choe, Masulis and Nanda (1993) find that negative announcements effects are diminished when the economy is in an expansionary phase, which is arguably when there may be reduced adverse selection risk.

Additionally, studies show that private equity issue announcements have a positive announcement effect, with share prices increasing in response to said announcements (Wruck, 1989; Kato & Schallheim, 1993). This result is again consistent with information asymmetry as it can also be argued that private equity issues are less susceptible to information asymmetries.

In a similar manner, investors might fear that the cash raised from the equity issue might be misused by the firm's managers in value-destroying behaviour resulting from 'empire building[16]' or 'managerial hubris[17]'. Thus, agency problems[18] could potentially compound the negative announcement effect. Jung, Kim and Stulz (1996), find evidence that firms with inferior managerial ownership, who are arguably more susceptible to the agency problems described above, have more negative price reactions to announcing the issue of new shares.

Although the implications of the market timing theory in conjunction with the adverse selection model are well-suited in explaining the negative announcement effects of SEOs, this does not necessarily mean that timing the market is the most dominant motive for issuing equity. All else equal, firms should predominantly issue equity out of the necessity to raise funds. There is also the school of thought that the expansion of a firm naturally leads to the point where the firm needs to issue more shares, which is simply a by-product of the firm's lifecycle stage.

Kim and Weisbach (2008) who studied SEOs across 38 non-African countries, found that the primary reason for firms issuing new shares was to raise funds to appease the near-term necessity for cash. They found that both the market timing theory and the stage of a firm's lifecycle, only play a role as secondary considerations. These results are echoed by the findings

[16] A term used to explain the actions of managers who attempt to aggressively grow their firm beyond the optimal size or increase their influence in the firm (Jensen, 1986).
[17] The over-optimistic belief held by the managers of bidding firms with respect to the value that they can potentially add to their firm by acquiring another firm. These beliefs may cause managers to over-estimate the value that the acquisition will bring (Roll, 1986).
[18] Agency problems, also known as agency costs, refers to the value lost by shareholders as a result of the conflicts of interests that exist between shareholders and managers (Jensen & Meckling, 1976). These conflicts of interest arise due to the separation of ownership and control.

of DeAngelo *et al*. (2010), who also found that both the market timing and life-style theories played a secondary role, with the primary consideration being the need for short-term cash. Moreover, the authors found that the lifecycle effect was quantitatively stronger in explaining the SEO decision when compared to the market timing effect, after finding that a large majority of firms with potential market timing opportunities, failed to take advantage of them.

Finally, there are those that question the efficacy of announcement effect analysis based on various arguments. Firstly, the measure of abnormal market returns is subjective with respect to the benchmark employed. Secondly, announcement effect analysis is framed in such a manner as to attempt to measure the stock market's reaction to the announcement, which is assumed to be unexpected. If investors had any prior expectation of the announcement occurring, then the recorded announcement effect surrounding the day of the announcement would be vastly underestimated (Ritter, 2003). Nonetheless, it is virtually impossible to test the expectations of the entire market. Thus, a common assumption must be made that these announcements are indeed unexpected. Thirdly, sometimes the most simple and logical explanations are overlooked. Basic economics and the law of supply and demand[19] predict that an increase in the supply of a good will lead to a decrease in the price of that good. Thus, the negative stock market reaction to the issue of new shares, should be at least partially explained by the law of supply[20].

In summary and in light of all the evidence, it is the adverse selection model, which describes the awareness of investors with respect to the manager's incentives to issue overvalued equity, that has emerged as the most prevalent theory in explaining SEOs (Chou & Lin, 2015). There is a barrier separating the information flow between investors and managers. Hence, even if managers are issuing shares for no other reason than to raise cash for operational activity, investors have reasonable doubt regarding the intentions of managers. This reasoning is what makes the adverse selection model the popular explanation for the market's generally negative reaction to SEO announcements. In addition, firms can potentially mitigate these negative

[19] The law of demand states that the price of a good increases (decreases) as the quantity demanded of that good increases (decreases). On the other hand, the law of supply states that the price of a good is negatively related to the quantity supplied of that good (Gale, 1955).
[20] This explanation makes the realistic assumption that the demand for most shares are not inelastic.

announcement effects by credibly communicating favourable reasoning behind the need for an equity raise.

It is also important to note that there are numerous, not necessarily mutually exclusive, motivations for issuing equity that can be broadly summarised into three categories: (1) to finance investments or operations; (2) to transfer wealth from new shareholders to existing shareholders; and (3) to increase liquidity for both the firm and the insiders (Kim & Weisbach, 2008). Firms may have different motives for issuing shares but the logic, that a preference would still exist for issuing shares during periods of high market valuations and robust market conditions, is difficult to refute.

2.3 SEO Performance (The Long-run Effects of SEOs)

With the Myers and Majluf (1984) adverse selection model seemingly explaining the negative announcement effect, the emergence of an overwhelming body of evidence reporting that markets also reacted negatively to SEOs in the long-run, sparked a wider and more contested debate.

With prior research focusing on the performance of firms conducting IPOs, the works of Loughran and Ritter (1995), and Spiess and Affleck-Graves (1995) are amongst the first studies to comprehensively document the long-run underperformance of issuing firms in comparison to similar non-issuing firms in the US. Ritter (2003), in summary of a large body of previous literature, concluded that firms that conducted SEOs had an average return of roughly 72% in the year before the announcement, which was then followed by an underperformance of approximately 5% per year in the five years following the equity issuance.

Meanwhile, the body of evidence documenting the remarkable underperformance of SEOs has since significantly grown in magnitude and the results are not unique to the US, with similar findings extending to other geographical markets. Levis (1993) studies IPOs and subsequent

right issues[21] conducted by firms in the UK, documenting similar patterns in the investment performance of SEOs. Kang, Kim and Stulz (1999), investigate the long-run performance of firms conducting public equity and debt offerings in Japan and find that these firms also performed poorly, with the exception of firms conducting SEOs through rights offers.

These results are also not unique to SEOs, but have also been well documented in research focusing on IPOs. For instance, Ritter (2003) reports that firms conducting IPOs subsequently underperform by approximately 7% per year in the five years following the initial listing of the firm. In fact, the long-run performance of IPOs relative to similar firms has been a phenomenon that has arguably received more academic attention. Thus, the existing literature heavily suggests that firms issuing equity underperform in the long-run, whether they are issuing equity for the first time (IPOs) or issuing new additional shares (SEOs).

There is also evidence documenting the deterioration in the operating performance of firms following SEOs. McLaughlin, Safieddine and Vasudevan (1996) document the deterioration of the operating performance of firms conducting SEOs by studying their median operating patterns. Loughran and Ritter (1997) investigate the operating performance of SEO firms and find that SEO firms display significant improvement in operating performance prior to the SEO, which is then followed by a substantial deterioration in operating performance subsequent to the offering.

The evidence of this persistent, arguably unexplainable long-run underperformance of SEO firms has huge behavioural implications and heavily casts doubt on the efficiency of the stock market. Naturally, these results and their potential implications demanded an explanation. Thus, two schools of thought have since emerged in an attempt to explain this phenomenon: (1) those focusing their models on rational explanations under a risk-return framework; and (2) those focusing their models on behavioural explanations that take into account human psychology as a major influence behind financial markets.

[21] A rights issue, also known as a rights offer, is the offering of new shares to existing shareholders. These new shares are usually offered at a discounted price.

2.3.1 Rational Explanations

The school of thought based on rational explanations attempts to explain this phenomenon of SEO long-run underperformance by basing their arguments on fundamentals which are generally linked to the risk-return framework. Following the argument presented by Fama (1998), that model misspecification may cause 'underperformance', the argument here is quite simple: if indeed SEO firms underperform in comparison to matching firms, then there must be an underlying risk that the model used for generating expected returns is failing to capture. The lower returns for firms conducting SEOs should be as a result of a lower risk level that investors are faced with. Other rational explanations of poor performance involve the agency theory which describes the potential value-destroying behaviour of managers.

Fama (1998) raises an interesting argument that SEO underperformance might be as a result of SEO firms not being evaluated against the correct benchmark. For instance, several studies have found that SEO underperformance is predominantly concentrated in small-growth firms, which implies that SEO underperformance may be attributed to the deficiencies of asset-pricing models in valuing these small-growth firms (Brav, Geczy & Gompers, 2000; Mitchell & Stafford, 2000).

However, Jegadeesh (2000) finds evidence that SEO underperformance persists despite the use of the best candidates for comparing benchmark returns. The author goes on to demonstrate that the differences between the underperformance of large- and small-firms conducting SEOs as documented in previous studies, was simply as a result of the inherent biases in the factor-model benchmarks used.

Spiess and Affleck-Graves (1995) find that SEO underperformance persists even after controlling for firm-size, market-to-book effects, and industry membership. They argue that although the underperformance of SEO firms may reflect a mismeasurement of risk, it is highly unlikely that traditional risk measures could explain the magnitude of the risk premium. For

example, these unknown risk dimensions would have to be able to explain a mean spread that exceeds 40% over the five-year holding period.

Another contentious issue, other than the selection of the asset pricing model, involves the matching firm technique employed. The debate centres on the appropriate matching procedure used to select the sample of non-issuing firms. This step is vital as the performance of these non-issuing firms is then used as the benchmark from which to compare the performance of SEO firms. Eckbo *et al*. (2000) argue that the 'new issues puzzle' reflects the inadequacy of the matching-firm technique in providing a suitable control for risk. The authors went on to develop a six-factor asset pricing model that was able to explain the performance of SEO firms in their sample. Ritter (2003) reports that matching firms based on the criteria of both size and market-to-book ratios, as opposed to a simple size match, helps attenuate the differences in share performance between issuing and non-issuing firms.

The main complication of the risk-return framework stems from the fact that any test of underperformance inevitably becomes a joint test of the model used to generate expected returns (Eckbo *et al*., 2000). Thus, rational models began to focus on explaining the reasons why SEO firms experience less risk and should therefore earn lower returns in comparison to non-issuing firms. The authors argue that SEO firms face lower systematic risk based on the following arguments: (1) the leverage hypothesis: issuing equity lowers leverage, which therefore lowers the firm's exposure to default risk and unexpected inflation; and (2) the liquidity hypothesis: issuing equity increases a firm's share liquidity, thus reducing the firm's exposure to liquidity risk.

Lyandres, Sun and Zhang (2005) find evidence in contradiction to the leverage hypothesis after finding that even after issuing equity, SEO firms generally have higher leverage ratios than matching non-issuers. However, they do find evidence in support of the liquidity hypothesis, by showing that issuing firms do tend to have lower liquidity betas than non-issuing firms. In further support of the liquidity hypothesis, Eckbo and Norli (2005) found that the use of a liquidity risk factor helped in explaining the 'new issues puzzle'.

Another growing avenue of research makes use of real-investment based explanations. These explanations are centred on real option theory[22]. Carlson, Fisher and Giammarino (2006) developed a real option model which argues that firms have a variety of expansionary options and assets in place before making their decision to issue equity. These growth options are risky, which explains why SEO firms have high betas prior to the equity issuance.

When a firm decides to issue equity in order to exercise an expansionary option, the firm's risk should decrease as the firm is converting the very risky growth options into less risky assets that are now in place. Even though the new assets in place might be risky, this model argues that these assets are still less risky than the options that they replace. The real option model highlights the importance of dynamic risk in the asset pricing context as argued by previous literature (Lewellen & Nagel, 2006). In fact, Carlson, Fisher and Giammarino (2006) found that using a dynamic beta approach led to SEO underperformance disappearing.

Zhang (2005), drawing inspiration from Cochrane (1991) who first proved the negative relationship between real investment and expected share returns, argued that investment is the most likely driving force behind the 'new issues puzzle'. These findings link perfectly with the real option model explanation. Lyandres, Sun and Zhang (2005) reported that adding a risk-factor based on capital investment into the CAPM and the Fama and French (1993) three-factor model, reduced the magnitude of SEO underperformance, making it largely insignificant.

In a later study, the authors demonstrated evidence that SEO issuing firms invested more than their non-issuing counterparts (Lyandres, Sun & Zhang, 2008). Many of these rational theories therefore predict that issuing firms increase investment following their equity issuance and that there is a negative correlation between the subsequent level of investment and post-issue share returns (Hertzel & Li, 2010).

[22] Real option theory concerns the opportunity of firms to invest, or stop investing, in real assets (McGrath, 1999). For example, both the choice on whether or not to take on a new project, and the choice on whether or not to stop a project that the firm is currently involved in, represent a real option to the firm.

On the contrary, other authors argue that the negative relationship between real investment and expected returns could be explained by managerial over-investment as a result of empire building (Titman, Wei & Xie, 2004; Anderson & Garcia-Feijóo, 2006). These explanations are based on the agency theory models, advanced by Jensen and Meckling (1976), which predicts that if firms issue equity and in doing so also decrease the management's shareholdings in the firm, then this will increase the conflicts of interest between managers and shareholders (Masulis & Korwar, 1986).

Managers, in pursuit of their own interests, might engage in value destroying behaviour which includes over-investing and empire building. This behaviour could be the explanation for SEO underperformance. Jensen (1986) hypothesises that free cash flow[23] is likely to be wasted in operational inefficiencies or wastefully invested in poor projects that destroy firm value, due to management's incentives to 'empire-build'. In line with agency theories McLaughlin, Safieddine and Vasudevan (1996) report that the decline in profitability of SEO firms is greater for SEO firms that have higher free cash flows.

Fu (2010) demonstrates that SEO firms have a significant tendency to invest more heavily than non-issuing firms. In further support of the over-investment hypothesis, the author finds a negative correlation between post-issue investment levels and subsequent operating performance. This overinvestment leads to a reduction in the firm's asset productivity that is more severe for firms that have relatively less investment opportunities available. In contradictory evidence, Lyandres, Sun and Zhang (2005) report that the negative correlation between investment and returns is more pronounced among issuing firms with stronger shareholder rights. Firms with stronger shareholder rights should be less susceptible to agency costs in comparison to firms with weaker shareholder rights.

Finally, and perhaps most controversially, is the literature proposing that the underperformance of SEOs is as a result of managers manipulating their earnings to attempt to 'cook-the-books'.

[23] Free cash flow, is the cash in excess of that necessary to fund all projects that add value to a firm (Jensen, 1986).

Essentially this smaller section of the SEO literature accuses the managers of certain issuing firms of cheating the market. Teoh, Welch and Wong (1998), and Rangan (1998) report that that the issuers with the highest levels of discretionary accruals, which may be used to enhance earnings relative to cash flows, demonstrate the worst post-issue share returns. Loughran and Ritter (1997) interpret their results, documenting the high pre-issue operating performance of SEOs which was followed by a declining post-issue operating performance, as implying that some, but not necessarily all, managers are successfully misleading investors.

In summary, although underperformance is highly sensitive to the model specification and methodology employed, the inconsistencies in predictions and evidence across the rational explanation models, leaves a lot to be desired. Simply claiming the possibility that unknown risk dimensions are not being taken into account, does not appear to be an adequate enough explanation for SEO underperformance, considering the magnitude of the risk premium which would have to be explained. Furthermore, the undeniable rise of behavioural finance seems to open up a door that cannot be closed. Surely, if rational models fail in explaining this phenomenon, then investor and managerial psychology must play a role. Rational models cannot avoid the burden of proof by simply speculating on the existence of an unknown risk factor. A reliable model, capturing and describing the return profile of issuing firms would go a long way in increasing the credibility of this argument.

Nonetheless, these rational explanations cannot be ignored either. The persistence of the issuing-firm underperformance for five years may naturally indicate some implications about the risk of SEO firms. The main behavioural argument, as discussed in the next section, centres on the over-optimism of investors who are then too sluggish in adjusting their opinions correctly to the news of the SEO. Investors may not behave in a completely rational manner, but it would be extremely difficult to imagine how the stock market could take such long periods, even reaching up to five years, to correctly adjust their predictions and opinions with respect to SEO firms. Therefore, surely there must be at least some element of risk involved in explaining the long-run performance of SEOs?

2.3.2 Behavioural Explanations

Although the market timing theory explains the initial negative response to SEOs, the persistence of this underperformance for periods extending up to five years after the SEO, has brought many authors to question whether the initial market reaction to SEO announcements is unbiased (Loughran & Ritter, 1995). The authors argue that the SEO firm's equity remains highly overvalued when the issue occurs because market participants do not correctly re-evaluate the shares in question. Eckbo *et al*. (2000) also argue that the long-run underperformance of SEOs suggests that the market essentially underreacts to the SEO announcements.

These findings cast doubt on the validity of the classical assumption of market efficiency and has led to the development of behavioural models in efforts to explain this phenomenon. These models argue that the psychology of market participants, which has been largely ignored by the rational explanations, can play a significant role in explaining many anomalies, including SEO underperformance. The main behavioural explanation for the underperformance of SEOs amongst the majority of research seems to be that investors and managers are over-optimistic about the prospects of the issuing firm. This leads to misvaluations, which create the opportunities and incentive for managers to attempt to time the market. Thus, over-optimism and the market timing theory seem to go hand-in-hand. This is not to say that only over-optimism may lead to the misvaluation of shares.

Loughran and Ritter (1997) propose that investors place too much weight on the past performance of the firm and less weight on more recent events. SEO firms have been shown to have increased profitability and exceptional share performance leading up to the equity issue, which is consistent with the predictions of the market timing theory. Investors seemingly overweight this recent performance, which is seen as 'good news', and seem to therefore also underreact to the SEO announcement, which is generally viewed as 'bad news'. It is even argued that investors place too much weight on their own private assessments rather than being more responsive to market signals (Daniel, Hirshleifer & Subrahmanyam, 1998).

This over-optimism may create a self-perpetuating cycle of underperformance. Considering that investors under-react to the SEO announcement, it could imply that the market is still overvaluing the firm's equity and therefore possibly encouraging management to issue more equity in an attempt to continue timing the market. This would serve to exasperate the underperformance of issuing firms (Daniel *et al.*, 1998). Numerous studies have shown that it is not uncommon for a single firm to make multiple equity issuances, even within the same year (Lyandres, Sun & Zhang, 2008).

In addition to the several studies highlighting the importance of market timing considerations in the decision to issue equity as discussed in Section 2.2, there is a large body of evidence in support of the predictions set forth by the market timing theory in explaining the long-run performance of SEOs. There are numerous studies that provide evidence of the significance of investor over-optimism in the long-run performance of SEOs. For instance, Loughran and Ritter (1995) demonstrate that the SEO firms that issue equity during periods of high issuing activity substantially underperform, whereas the firms issuing equity during periods of low issuing activity barely underperform at all.

These results were echoed by Spiess and Affleck-Graves (1995), who also find evidence consistent with market timing after arguing that the long-run underperformance of SEO firms is as a result of investors inadequately responding to the information conveyed in the SEO announcements in a timely manner. Investor over-optimism is further highlighted in the literature documenting the pre-issue outperformance of issuing firms as findings show that issuers are generally firms with excellent share performance prior to issuance (Ritter, 2003).

Another way of gauging investor over-optimism is to study the behaviour of insiders[24] during the issuing process, as well as the market's reaction to the earnings announcements of issuing firms following the issuance. Teoh *et al.* (1998) study the predictions and subsequent realisations of earnings announcements around the SEO and find evidence that investors are too optimistic about the earning prospects of SEO firms.

[24] Generally, any employee, director or owner of a firm who has access to material, non-public information.

Jegadeesh (2000) studied the four-day earnings announcement window of SEO firms following the issue in order to gauge whether investors were disappointed or not with regards to the actual earnings revealed in the announcement in comparison to their predictions. The results showed that SEOs underperformed by approximately twice as much during these earnings announcement periods than they did outside of these periods. The author concluded that this severe underperformance indicated disappointed investors who were over-optimistic about the long-term prospects of issuing firms at the time of issuance. Dennis and Sarin (2001) also reported significantly negative earnings announcement effects from the second quarter following the SEO until three years afterwards.

Clarke, Dunbar and Kahle (2001) find that issuing firms, on average, significantly underperform over five years when their shares are sold by insiders. However, they find no significant underperformance for issuing firms when their shares are sold by non-insiders. Insiders are assumed to have more information with regard to the firm and its appropriate value than non-insiders. Therefore, the selling of shares by these insiders prior to the issuing firm's severe long-run underperformance, is consistent with insiders selling their shares for opportunistic reasons. This adds further support to the 'window of opportunity' hypothesis.

Managers may also be over-optimistic, given the recent share performance of the firm prior to the SEO. This may lead to managerial hubris and subsequent over-investment which might also explain the underperformance of SEO firms (Heaton, 2002). A distinction must be made between the over-optimism of managers leading to over-investment (a behavioural explanation) and the agency costs that describe the rational incentives for managers to engage in empire-building, which may also lead to over-investment as described in Section 2.3.1. In essence, managers may deliberately or as a result of excessive optimism engage in value-destroying behaviour.

In contrast to the predictions set out by the market timing theory, Jung, Kim and Stulz (1996) studied the decision between debt and equity and found that future excess share returns played

no significant role in determining the type of issue. However, both a firm's market-to-book ratio and prior excess returns played a significant role in the issuing decision. Lyandres, Sun and Zhang (2005) cast some level of doubt on the market timing hypothesis after finding that there is no significantly negative cross-sectional relationship between SEOs and future share returns after controlling for both size and market-to-book ratios.

Mahajan and Tartatoglu (2008) study SEOs conducted in G-7 countries[25] and find evidence that contradicts the market timing theory. The authors found that in all seven countries, with the exception of Japan, both the effect of issuing equity and the effect that attempting to time the market has on leverage, was temporary. The authors argued that these results were more in line with the dynamic trade-off model and inconsistent with the market timing hypothesis.

Overall, these findings seem to challenge the concept of market efficiency as informed investors have the possibility to earn superior returns by capitalising on the underreaction and overreaction of naïve investors, without having to take on additional risk. In order to test for the market timing theory, models require a proxy that indicates periods where shares are overvalued. Although measures such as market-to-book ratios and previous abnormal returns serve as popular proxies used to indicate market timing opportunities, these measures are not without their flaws (as discussed in Section 3.1). In response, measures of investor sentiment has become the focus of many behavioural studies attempting to examine the credibility of the market timing theory. Investor sentiment is arguably a more direct and improved measure in indicating investor over-optimism.

Naturally, various authors began by dedicating their research to investigating the impact of investor sentiment on share prices, with literature as early as Keynes (1936) considering the possibility that the influence of investors driven by sentiment could cause prices to deviate from fundamentals. It has been well documented that investor sentiment does indeed influence and help predict share returns in both the short-run (Kaniel, Saar & Titman, 2008) and also in the long-run (Brown & Cliff, 2004). In order for sentiment to influence the markets, and for

[25] Canada, France, Germany, Italy, Japan, the UK and the US.

the deviation from fundamentals to persist over extended periods of time, there must also be constraints on arbitrage that limit rational arbitrators from fully exploiting the mispricing (Baker & Wurgler, 2006).

Building on the work of Yuan (2008) who provided empirical evidence that sentiment-driven investors are more active and trade more aggressively during periods of high-sentiment, Yu and Yuan (2011) argue that: (1) sentiment traders influence the market to a greater extent during periods of high-sentiment; and (2) these investors that trade based on their sentiment are inexperienced and naïve. Thus, periods of high-investor sentiment could disrupt the positive risk-return relationship in the stock market as the authors go on to prove. Using the investor sentiment index developed by Baker and Wurgler (2006), the authors show that while the mean-variance relationship is positive during periods of low-investor sentiment, the relationship demonstrates little, if any, significant correlation when investor sentiment levels are high. The authors also find evidence that shares are generally overvalued during periods of high sentiment as over-optimism causes investors to bid up the price of shares.

A clear presumption made by many of these studies is that sentiment-driven investors are naïve and tend to have an inferior understanding of how to measure risk, and are therefore more predisposed to miscalculating the variance of expected returns (Yu & Yuan, 2011). Given that during high-sentiment periods shares are more likely to be overvalued, it would also make sense that more firms would issue equity during these periods in an attempt to take advantage of the window of opportunity. Chou and Lin (2015) find that small and young firms have a higher probability of issuing equity during periods of high sentiment, also implying that the effects of investor sentiment is stronger for smaller, younger firms. This would make sense, as these firms are more likely to be influenced by investor sentiment and might also face more constraints on arbitrage. For example, small shares might face greater liquidity challenges than larger shares, which could prevent arbitrage from taking place and thus allowing the mispricing to persist.

Chou and Lin (2015) further report that: (1) firms that conduct SEOs during high-sentiment periods experience less negative abnormal returns surrounding the issuing day, *vis-à-vis* firms

that conduct SEOs during low-sentiment periods; and (2) firms conducting SEOs during high-sentiment periods also experience more severe long-run underperformance.

In summary, the behavioural theories argue that SEO long-run underperformance is explained by investor and managerial over-optimism. Market participants appear to place too much emphasis on the past performance of SEO firms and are too slow in reacting to the current market signals. These models raise a strong challenge to market efficiency as they allow for persistent deviations from fundamentals. The main challenge faced by behavioural finance is the difficulty in 'measuring' the psychology of market participants and therefore, the difficulty in developing a model that explains all behavioural biases. As a result of the shortage in empirical behavioural models that can be tested, behavioural theories generally require the use of rational models to aid in testing its predictions. For example, even behavioural studies measure deviations from expected returns using asset pricing models. Therefore, many behavioural models are by definition exposed to the same joint-hypothesis and model-specification issues that plague the rational models.

2.4 The South African Literature

A major motivation behind this study was the lack of research conducted in South Africa with respect to the long-run performance of SEO firms. Instead, much of the existing, relevant South African literature focuses on IPOs and the capital structure decision as a whole. In line with international evidence, South African studies have also found evidence of IPO underperformance on the JSE (Page, 1997; M'Kombe & Ward, 2002; Chipeta & Jardine, 2014). Therefore, even though the topic of SEOs has been largely ignored in the South African context, it might be a reasonable assumption to assume that the international patterns found surrounding SEOs would also be found in the South African context as the international evidence suggests that similar trends that are found in IPOs, are generally also found in SEOs.

Auret and Britten (2008) examine the post-issue operating performance of IPOs on the JSE and found that issuing firms experienced an increase in their profitability (as captured by returns on assets) leading up to the IPO which was then followed by significant declines in profitability

in the third year subsequent to the IPO. The authors cited their findings as evidence in support of the market timing theory and the possible tendency of managers to over-invest.

Chipeta and Jardine (2014) report findings of a significantly negative relationship between the volume of IPOs and long-run performance, as well a significantly negative relationship between pre-IPO revenue forecasts and subsequent post-issue operating performance. The authors argue that these findings suggest that the IPO market in South Africa is affected by the 'fads and over-optimism' theory suggested by Ritter (1991)[26].

Finally, Dalika and Seetharam (2015) further highlight the importance of investor sentiment in the South African context, by providing evidence that investor sentiment has a strong impact on share returns on the JSE. Their results suggests that during low-sentiment periods, shares that are more sensitive to sentiment[27] experience higher returns, a pattern that fully reverses in periods of high sentiment. The authors measure investor sentiment using the investor sentiment index developed by Baker and Wurgler (2006), which they adapt to the JSE[28].

2.5 Summary of the Literature

This chapter ultimately provides the theoretical background that has gone on to inspire and heavily influence this study. Firstly, Chapter 2 begins with a brief review of the capital structure literature which has laid the foundation for the advancement of the SEO literature. Secondly, a review of the SEO literature appears to demonstrate two common patterns: (1) markets generally react negatively to SEO announcements in the short-run; and (2) SEO firms generally underperform in the long-run. While the negative announcement effects, describing the short-run performance of SEO firms, appear to be well explained by the adverse selection model set forth by Myers and Majluf (1984), the long-run underperformance of SEO firms, for periods

[26] Ritter (1991) argued that the patterns in the US IPO market were consistent with investors being over-optimistic with respect to the earnings potential of young, growth firms. This over-optimism creates a 'window of opportunity' for managers to take advantage of.
[27] These shares include: smaller shares, growth shares, high volatility shares, and younger shares.
[28] The investor sentiment index, as well as the four variables used to formulate the index, are discussed in greater detail in Sections 3.1 and 4.2.1.

reaching up to five years post-issuance, has sparked a literary debate that appears far from being resolved. Opinions are divided between the rational and behavioural explanations for this phenomenon known as the ‘new issues puzzle’. Rational models argue that this phenomenon should be explained by risk or by the potentially value-destroying behaviour of managers as a results of agency costs. Behavioural theories, spearheaded by the market timing theory, describe the over-optimism of investors and managers as the catalysis for this phenomenon. Ultimately, there appears to be no real consensus in explaining the long-run performance of issuing firms as the ‘puzzle’ remains unsolved.

3 Theoretical Motivations for the Empirical Framework

This chapter aims to describe the key literature that has aided several of the crucial methodological decisions made in this study. Given the wide range of existing literature, there are various contentious issues and inconsistencies in academic opinion with respect to studying the performance of SEO firms. Various aspects of this study were therefore selected based on the discretion afforded by the contribution of the existing literature. This chapter, in conjunction with the literature described in Chapter 2, aims to justify and motivate the decisions behind the methodology described in Chapter 4, whilst also serving to highlight the robustness of the comprehensive methodology applied in this study.

3.1 Measuring Investor Sentiment

The market timing theory is based on the precept that managers are able to decipher between whether their firm's shares are overvalued or undervalued. Therefore, in order to test the predictions and implications of the market timing theory, a method of testing for the mispricing of shares is required. Based on the existing literature, it appears that the market-to-book ratio, the pre-issue abnormal returns, and the post-issue abnormal returns are among the most prevalent gauges of share mispricing, which can serve to highlight a window of opportunity for managers wishing to time the market[29]. However, these measures have a major flaw in that they might not necessarily indicate mispricing (DeAngelo *et al*., 2010).

For instance, Hertzil and Li (2010) illustrate how market-to-book ratios can be decomposed into two separate growth option and mispricing components. Moreover, measuring post-issue and pre-issue abnormal returns may be problematic as the estimation of 'normal returns' is highly subjective to the asset pricing model implemented by the researcher (Fama, 1998).

Not only are these measures problematic, there is also substantial evidence documenting their limited aptitude in predicting a firm's SEO decisions. For instance, DeAngelo *et al*. (2010)

[29] For example, see Baker and Wurgler (2002).

report that the majority of firms conducting SEOs in their comprehensive sample are not firms with either high market-to-book ratios, high past returns, or low future returns.

Other popular measures of investor sentiment such as the Chicago Board Options Exchange volatility index (VIX index)[30] and the Put-Call-Ratio[31] (PCR) have been shown to have significant flaws and cause for questioning. For instance, Kumar and Persaud (2002) argue that the VIX index could just as likely be signalling changes in the market's underlying risk itself, as it could be signalling changes in the attitude of investors towards risk; two distinct phenomena that cannot be separated.

In addition to the shortcomings of using the VIX index, the data restrictions in the South African direct equivalent, known as the South African Volatility Index (SAVI), is also an important consideration. Since its introduction, the index has become a popular measure of investor sentiment in South Africa (Koetze, Joseph & Oosthuizen, 2009). Unfortunately, the SAVI was only introduced in 2007 and therefore falls rather short in covering the entire sample period of this study.

In response to the many of the above mentioned criticisms, the investor sentiment index developed by Baker and Wurgler (2006) has emerged as a popular tool used to test many behavioural theories. Periods of high sentiment as indicated by the index, is often used as a more reliable indication of a window of opportunity for managers to time the market. An additional benefit of using the investor sentiment index is that it makes use of a combination of various measures used to proxy investor sentiment, as well as offering the flexibility to adapt the index to different stock exchanges as illustrated in Section 4.2.1.

In conclusion and in light of the existing literature, this study measures investor sentiment by implementing the yearly investor sentiment index developed by Baker and Wurgler (2006), with additional adjustments made in adapting the index to the South African context in light of

[30] An index measuring the implied volatility of the S&P 500 index options.
[31] Measured as the ratio of puts outstanding to calls outstanding.

the recent findings of Dalika and Seetharam (2015). The investor sentiment index is generally accepted, in theory, as the most robust measure of investor sentiment. Other popular measures that indicate potential over-valuation of equity as a result of investor sentiment (namely the market-to-book ratio and prior abnormal share returns) are used in the regression models, which analyse the potential influences on a firm's decision to conduct a SEO as discussed in the next section.

3.2 Examining a Firm's SEO Decision

This section briefly describes the logit regression analysis undertaken in this study, which was based on the work of Chou and Lin (2015). The aim of these regression models are to analyse the influences of a firm's decision on whether or not to issue shares with the following explanatory variables employed: (1) Investor sentiment[32]; (2) market-to-book ratios; (3) prior abnormal share returns; (4) future share returns; and (5) age.

All of these variables have been found in previous literature to be significant predictors of a firm's decision to issue equity. For example, Jung, Kim, and Stulz (1996) reported that prior abnormal returns and the market-to-book ratio of the firms, at the time of conducting the SEO, are significant determinants of SEOs. DeAngelo *et al*. (2010) find a significant relationship between the probability of conducting a SEO and common measures of mispricing, such as pre-issue abnormal returns, market-to-book ratios, and the age of a firm. Chou and Lin (2015) find that all the variables used in the logit regression mentioned above generally demonstrate a significant influence on a firm's probability of conducting a SEO.

3.3 Explaining the Market's Reaction to SEO Announcements

This section discusses the explanatory variables that could potentially aid in explaining the market's reaction to SEO announcements. Besides the potential for investor sentiment to influence the market's reaction, the characteristics of the firm issuing the equity, as well as the

[32] As measured using the investor sentiment index discussed in Section 3.1 and 4.2.1

details revealed in the SEO announcement, also have the potential ability to significantly impact the market's reaction.

In particular this study makes use of four explanatory variables used in the regression analysis aimed at further explaining the market's reaction to SEOs: (1) the issuing firm's size; (2) the firm's Tobin's Q-ratio; (3) the age of a firm (proxied by the number of years that the firm has been listed on the JSE); and (4) the size of the issue relative to the size of the issuing firm. The theoretical motivations for these choices are mentioned below.

A firm's characteristics could potentially influence the ability of a firm to time the market and subsequently influence the market's perception of the SEO announcement. Evidence suggests that investor sentiment has a stronger influence on firms that are subject to more severe arbitrage constraints (Baker & Wurgler, 2006). These firms are arguably more susceptible to misvaluations thereby increasing the incentive for the managers of these firms to time the market.

The adverse selection model set out by Myers and Majluf (1984) predicts that investors could potentially be more sceptical of the SEO announcements of these firms leading to a more severely negative response. For example, Chou and Lin (2015) find that smaller and younger firms have a higher probability of conducting an equity issue during periods of high-investor sentiment. These findings highlight the potential influence of a firm's size and age on the market's response to SEO announcements.

This study takes a similar approach used by Chou and Lin (2015) in proxying a firm's age with the number of years that the firm has been listed on the JSE. This proxy, as opposed to using a firm's actual age, has the benefit of adding an extra measure of investor familiarity with the firm in question. Investors are more likely to recognise a firm that has been listed on the JSE for a longer period of time, given the availability of public information with regard to the firm's 'track record'. Investors are perhaps even more likely to trust a firm that has been listed for a

longer period of time, or at least be able to make a more informed decision in forming their response to the SEO announcement.

Investors do not only fear that managers are issuing shares in order to time the market, but they also worry about the intentions of the managers with respect to the use of the funds. Markets might exhibit less negative reactions when a firm is able to convince the market of a positive reason for issuing the new shares (Ritter, 2003). Jung, Kim, and Stulz (1996) offer evidence that markets react less negatively to the announcements of firms that appear to demonstrate good investment opportunities, as indirectly measured by a firm's Tobin's Q-ratio. Naturally, the firm's intended use of funds and the issue size may further influence the market's reaction.

In contrast to these opinions, Barclay and Litzenberger (1988) find that neither the intended use of the proceeds, the size of the issue, nor the estimated profitability of the firm's planned investment (also proxied by the firm's Tobin's Q-ratio), have any significant correlation with the announcement effect.

Due to the lack of literature in the South African context with regards to SEOs, this study was indebted to explore the potential relationships of these various influences on SEO announcement effects. Regrettably, the majority of SEO announcements lacked sufficient details to appropriately categorise SEO announcements based on the intended use of funds. Hence, the intended use of funds was not examined as an explanatory variable in the regression analysis conducted in this study.

3.4 Selecting the Firm Matching Procedure

The procedure used to match issuing firms to similar non-issuing firms is crucial. Fortunately, the literature seems to be relatively consistent and harmonious in this regard. An overview of the literature reveals two clear frontrunners: (1) a size-matching procedure; and (2) a style-matching procedure.

The size-matching procedure simply relies on matching two firms based on their proximity in size. Despite the simplicity of this approach it has been widely used, even in more recent literature (Lyandres, Sun & Zhang, 2008). However, there is a growing body of evidence documenting the relative superiority of the style-matching procedure, which matches firms on the basis of both their size and market-to-book ratios.

Ritter (2003), demonstrated how matching firms simply based on size introduced confounding effects. He found that issuing firms were mainly growth firms[33], while non-issuers tended to be value firms[34]. Therefore, previous literature comparing issuing firms with non-issuing firms that were matched by size were also potentially comparing value firms with growth firms by extension, which highlights the added benefits of matching firms by both size and market-to-book ratios. Hertzel and Li (2010), echoing the findings of Ritter (2003), documented that adding the market-to-book ratio in the matching procedure significantly diminished the difference in underperformance of industrial issuing firms relative to their non-issuing counterparts.

Despite the developments of more complex matching procedures, the two aforementioned approaches are the most popular matching procedures amongst academics. Attempts to match firms on additional characteristics, such as pre-issue investment to asset ratios (Carlson, Fisher & Giammarino, 2006) and industry clustering (Spiess & Affleck-Graves, 1995), have not really caught on and represent the exceptions more so than the rule. Therefore, this study makes use of both the size-matched and style-matched procedures in support of the existing body of literature.

[33] Firms whose shares tend to trade at a higher price relative to fundamentals. For instance, firms with high-market-to-book ratios.
[34] Firms whose shares tend to trade at a lower price relative to fundamentals. For example, firms with low market-to-book ratios.

3.5 Measuring Long-run Performance

The majority of the literary debate centres on the differences in methodological ideologies regarding the measuring of a firm's long-run performance. Firstly, existing literature seemingly focuses on either the operating performance or the share price performance of SEOs, with very few studies simultaneously exploring both in the same body of work. This study comprehensively tests both a firm's share performance (market-based performance) and a firm's operating performance (accounting-based performance). Both measures of performance reveal different facets of a firm's financial performance (Chetty, Naidoo & Seetharam, 2015). Whilst accounting-based measures reflect the historical aspects of a firm's financial performance (McGuire, Schneewies & Hill, 1986), market-based measures reflect the forward-looking aspects of a firm's financial performance. Whilst there appears to be a general consensus with respect to measuring the operating performance of a firm, the correct approach to measuring a firm's share price performance remains a fiercely debated issue.

3.5.1 Measuring Share Price Performance

The measure of a share's long-run performance is arguably the most contentious issue across the SEO literature. Therefore, for complete transparency, this section comprehensively discusses the relevant literature and motivations behind the approaches selected in this study to evaluate long-run share performance. Ritter (2003) summarises the general sentiment with regards to this challenge in concluding that the abnormal performance of issuing firms is highly sensitive to both the methodology undertaken and the sample used. Indeed, there are countless cases of authors reaching completely different conclusions based on alternative methodologies. If there was indeed consensus on this matter, then perhaps this phenomenon would not be referred to as the 'new issues puzzle'.

Arguably, the most common measure of share performance across the SEO literature is the use of a simple buy-and-hold return approach. One of the major criticisms of this approach is its utter disregard for risk. Simple buy-and-hold returns do not factor in that issuing and non-issuing firms could very well have completely different risk profiles. Therefore, these firms could naturally demonstrate a different return profile, assuming the realisation of the rational risk-return framework set out in traditional finance.

Another popular model that does employ a benchmark, is the buy-and-hold abnormal market returns approach. The firm's long-run performance is measured as its cumulative deviations from the returns of the market. Again, the major criticism of this model is its failure to correctly account for risk, as the returns are merely compared with the returns of the market, without any further attention paid to risk. Despite this major criticism, the buy-and-hold return approach and the buy-and-hold abnormal return approach remain popular measures of share performance in the existing literature. Perhaps this is because these approaches avoid the joint-hypothesis problem which is discussed in the next paragraph.

In response to the literature arguing in support for the importance of risk considerations, some researchers propose the use of an asset pricing model that predicts expected returns, which should then be used as the benchmark for actual returns. The most popular asset pricing models, such as the CAPM and the Fama and French (1993) three-factor model, emerged as the commonly used candidates to generate these benchmark expected returns. The main concern with this approach is the inevitable joint-hypothesis problem. Any test for abnormal returns aimed at testing for deviations from expected returns, also becomes a joint test of the asset pricing model used to generate these expected returns (Eckbo *et al.*, 2000).

To make matters worse, the choice of asset pricing model is a highly contentious issue in its own right. Whilst the aim of this study is not to make a direct comment on the asset pricing environment in South Africa, it is important to take note of the inconsistent empirical evidence across the international asset pricing literature, which on a whole fails to universally support the use of any specific asset pricing model. For example, the emergence of the well-documented size effects, value effects, and momentum effects cast a huge shadow of doubt on the ability of the CAPM to adequately predict returns[35]. These findings are not unique to the CAPM, as asset pricing remains a puzzle in itself. The emergence of behavioural finance has introduced even more doubt on the previously held notion that behaviour of stock market participants could always be described as rational.

[35] For example, see Banz (1981), Reinganum (1981), Rosenberg, Reid and Lanstein (1985), Fama and French (1992), and Jegadeesh and Titman (1993).

Moreover, one must note the relevant literature that comprehensively documents the challenges associated with obtaining unbiased inferences when measuring buy-and-hold returns and cumulative abnormal returns (Lyandres, Sun & Zhang, 2005). For example, Fama (1998) argues that 'bad-model' problems are most prevalent when calculating long-run buy-and-hold abnormal returns, as any of the model's difficulties in explaining short-term returns are compounded[36]. Barber and Lyon (1997) demonstrate that bid-ask 'bounce' can lead to a rebalancing bias when examining the equally-weighted returns of a portfolio. In essence, every time the portfolio is rebalanced, less weight is put on the shares that have had positive returns (traded last at the ask price) and more weight is put on the shares that have declined in price (traded last at the bid price).

A prevalent solution to these various challenges, is the use of factor regression models to examine abnormal long-run share performance. However, this method is usually used in conjunction with the more traditional, albeit problematic, aforementioned measures of share performance. Moreover, across the more recent SEO literature, the buy-and-hold abnormal return approach is a more popular method for measuring long-run share performance than the cumulative abnormal return approach. Fama (1998) argues that the long-term experience of an investor is more accurately captured by obtaining long-run buy-and-hold returns than by obtaining cumulative abnormal returns. The author further argues that the cumulative abnormal returns approach fails to accurately measure the long-run returns received by an investor who holds a security for a long post-event period. The buy-and-hold abnormal returns approach also helps avoid the problems associated with frequent transactions (Barber & Lyon, 1997).

Finally, a majority of the literature uses both an equally-weighted approach and a value-weighted approach when measuring the long-run performance of either individual shares or a portfolio of shares. Although the simpler equally-weighted approach is more popular, the value-weighted approach is typically seen as a robustness measure for comparing results. For

[36] Fama (1998) describes the 'bad-model' problem as the problems experienced by all models of expected returns, which is as a result of their limitation in describing the complete description of the patterns of average returns during any sample period.

instance, Fama (1998) argues that many of the anomalies documented in the literature are severely reduced in magnitude and even disappear when using a value-weighted approach, instead of an equally-weighted approach. The author also argues that the value-weighted approach provides a better representation of the wealth effect of investors. Hertzel and Li (2010) demonstrate that using a value-weighted return approach, instead of an equally-weighted approach, significantly attenuated the underperformance of industrial SEOs.

In summary, the selection of an appropriate benchmark is subjective and ultimately bears a vital influence in the results of any analysis. In light of the literature, this study makes use of three share performance measures: (1) simple buy-and-hold returns; (2) buy-and-hold abnormal returns, with share returns compared to market returns as the benchmark; and (3) buy-and-hold abnormal returns, with the realised share returns compared to their expected returns as predicted by the CAPM. As mentioned above, although these measures are in no way perfect, they do represent the most popular measures across the literature. For robustness and in response to the documented flaws of these measures, this study also implemented factor regression models to evaluate long-run share performance in addition to using both an equally-weighted and value-weighted approach for all the aforementioned share performance measures.

3.5.2 Measuring Operating Performance

Measuring the operating performance of a firm is a much simpler task when compared to the challenges of measuring share performance. Although, there are contentions regarding the best accounting measures of a firm's operating performance, this study makes use of arguably the three most popular accounting measures in the SEO literature: (1) earnings per share (EPS)[37]; (2) return on assets (ROA)[38]; and (3) return on equity (ROE)[39].

All three of these accounting ratios are commonly used in literature as empirical measures of a firm's profitability. For instance, Auret and Britten (2008) measured the profitability of IPO firms listed on the JSE using ROA, whilst Chipeta and Jardine (2014) used both ROA and

[37] The monetary amount of a firm's annual profits (or net income) attributable to each outstanding ordinary share.
[38] The annual earnings attributed to ordinary shareholders divided by total assets.
[39] The annual earnings attributed to ordinary shareholders divided by the total book value of equity.

ROE. Chetty, Naidoo and Seetharam (2015) studied the effect of corporate social responsibility on the financial performance of firms listed on the JSE, and used all three accounting measures as a proxy for firm profitability.

The objective here is to examine the effect of the equity issuance on the operating performance of the issuing firms, therefore comparative operating performance is not measured on an absolute basis but instead, the year-on-year percentage changes are compared. Following the contribution of DeAngelo (1988) documenting the skewness of various accounting ratios, it is common across the literature to examine the median values of these accounting ratios.

3.6 Sample Selection Criteria

This section briefly discusses the theory behind the relatively stringent selection criteria described in this study. Firstly, and in line with the majority of the existing body of research, firms belonging to the financial and utility sectors are excluded. Firms belonging to these sectors seem to operate in different manners and under unique conditions, and are therefore excluded from the sample. For example, financial firms have been shown to have extremely high leverage ratios that may distort accounting ratios (Loughran & Ritter, 1997), whilst utility firms are often governed under different regulations, which may influence management's ability to time the market (Eckbo & Masulis, 1992). Due to the unique intricacies of these firms, they are likely to experience a different market reaction subsequent to issuing new shares, and are therefore excluded from the sample. In addition, the aim of this study is to specifically study the performance of firms that invest in real assets, hence the exclusion of financial firms.

Secondly, since the focus of this study is on the issuing of new shares for cash, mixed security offerings and rights offers are excluded. This is not unique to this study and is in line with the majority of the existing SEO literature. Mixed security offerings are excluded as it is virtually impossible to decipher the contribution of each security to the overall market's reaction to the mixed security offering. Rights offers are excluded because they are only made to existing shareholders and at a discounted price, which naturally leads to a downward price pressure

following the rights offer announcement. While this can be factored into the analysis, a further complication arises from the manner in which rights offers are conducted in South Africa. Firms commonly make the announcement of a rights-offer in multiple stages, first announcing only the intention to conduct the rights-offer, and then finalising the rights offer's details (which may also occur through more than one announcement). This makes it extremely difficult to correctly analyse the market's reaction to a firm's rights-offer announcement as new information is potentially only released through different announcements over time.

Finally, firms that make multiple issues are included in the sample in line with the methodology employed by Lyandres, Sun and Zhang (2008), who showed that their results were robust to the exclusion of these firms. In light of the inconsistencies in the literature with regards to dealing with firms that make multiple announcements, the analysis undertaken in this study also tests for robustness by excluding firms that make multiple announcements within a five-year period.

3.7 Summary of the Theoretical Motivations

This chapter motivates and clarifies the decision-making process behind the methodological exploits of this study in order to provide total transparency. Firstly, it highlights the advantages of measuring investor sentiment using the yearly investor sentiment index developed by Baker and Wurgler (2006), with the adaptation of the index to the JSE by Dalika and Seetharam (2015). Secondly, a theoretical motivation is given for the selection of the explanatory variables used in the two distinct regression models: (1) describing a firm's decision to conduct a SEO; and (2) describing the market's initial reaction to the SEO announcements. Thirdly, the firm matching procedure is discussed which details the popular size-, and style-matching approaches that were selected in this study. Fourthly, the comprehensive measures of both the long-run market performance and the long-run operating performance of firms are discussed. Finally, the theoretical motivation for the stringent sample selection criteria applied in this study is discussed.

4 Data and Methodology

This chapter is divided into three main sections. The first section describes the data collection process as well as the sample selection criteria. The second section describes the overall research design, detailing the empirical models undertaken in this study. The third section discusses the limitations of this study as well as underlining the future avenues for research. The methodology for this study has been based on the methodologies undertaken by Loughran and Ritter (1995; 1997), Baker and Wurgler (2006), and Chou and Lin (2015), with additional considerations based on the work of Dalika and Seetharam (2015).

4.1 Sample and Data Collection

SEO announcements were found using the INET BFA Expert data base, which has a record of all the relevant Stock Exchange News Service (SENS) announcements[40] for all listed and delisted[41] firms on the JSE during the period of 1998 to 2015. The following keywords were used in the search: accelerated book-build, equity raises, new ordinary shares, and new shares. The sample period does not precede 1998 due to restrictions in the availability and reliability of the announcements prior to 1998. Only announcements relating solely to the issue of new shares for cash are included in the sample. Rights-offers and mixed security offerings are excluded.

As detailed earlier, financial and utility firms were excluded from the sample. Firms that make multiple issues within a five-year period were included in the sample[42], and if a firm does make multiple announcements within a five-year period, the first announcement is used. Share price data, firm characteristics, accounting ratios, and the inputs for the asset pricing model were gathered from the INET BFA Expert database as well as from the Findata@Wits database. Finally, the analysis in this study involves the common assumption that the SEO

[40] The JSE's SENS announcements provide the public with access to material announcements made by firms.
[41] Henceforth, delisted firms are included in the sample in order to avoid survivorship biases.
[42] For robustness, the results are also examined after excluding firms that make multiple announcements within a five-year period.

announcements collected represent the release of new, previously unexpected information to the public.

4.2 Description of Overall Research Design

4.2.1 Measuring Investor Sentiment

Investor sentiment is measured using the yearly market-based investment sentiment index constructed by Baker and Wurgler (2006), with adjustments made following the contributions of Dalika and Seetharam (2015), leading to the use of the following index of investor sentiment:

$$SENTIMENT = 0.623\,NIPO + 0.451RIPO + 0.482\,Premium + 0.420TURN \quad (1)$$

Where annual investor sentiment (*SENTIMENT*) is compiled using four measures: (1) The number of IPOs issued during the year (*NIPO*); (2) the average first-day returns of IPOs issued during the year (*RIPO*); (3) The volatility premium (*Premium*)[43]; and the JSE share turnover (*TURN*)[44]. Similar to Chou and Lin (2015), high (low) investor sentiment periods are defined as the years that the investor sentiment index is above (below) its median during the sample period of 1998 to 2015.

This study made use of logit regression models to test the impact of investor sentiment on SEO probability (Hypothesis 3) using the procedure applied in DeAngelo *et al*. (2010) to calculate standardised market-to-book ratios and market-adjusted share returns. The logit model for SEO probability is specified as:

$$SEO_{it} = \alpha + \beta_1 SENT_t + \beta_2 \frac{M}{B_{it}} + \beta_3 PriorRT_{it} + \beta_4 FutureRT_{it} + \beta_5 Age_{it} + \varepsilon_{it} \quad (2)$$

Where SEO_{it} is a dummy variable (which is equal to 1 if firm *i* conducts a SEO in year *t*, and zero if not); $SENT_t$ is the yearly sentiment index in year *t*; M/B_{it} is the standardised market-to-

[43] Measured as the year end log ratio of the value weighted average market-to-book ratio of high volatility shares divided by that of low volatility stocks, where the top (bottom) three volatility deciles represent the high (low) volatility shares (Dalika & Seetharam, 2015).
[44] Measured as the log of total market turnover (the total rand volume of shares traded over the year) divided by the total market capitalisation of the JSE at the end of the previous year (Dalika & Seetharam, 2015).

book ratio for firm *i* in year t[45]; $PriorRT_{it}$ is the market-adjusted share return for firm *i* over the 12 or 36 months ending immediately before the year t[46]; $FutureRT_{it}$ is the market-adjusted return for firm *i* over the 12 or 36 months starting immediately after the year t[46]; and Age_{it} is the number of years that the firm *i* has been listed on the JSE in year *t*. *Ceteris paribus*, a positive sign is expected for β_1 implying that investor sentiment positively influences a firm's SEO decision. ε_{it} is the error term. The regression analysis is limited to firms with all the available relevant information.

Finally, a correlation matrix, condition indexes, as well as the Durbin-Watson statistic, are generated to test for correlation and multi-collinearity between the investor sentiment index and the other dependent variables used in the regression models. These tests are also conducted to test for the correlation between the dependent variables of the regression models and the individual variables that form the investor sentiment index.

4.2.2 Announcement Effects

4.2.2.1 Event Study Analysis

Firstly, an event study is undertaken in order to determine the market's short-run reaction to the SEO announcement (Hypothesis 1), using the market-adjusted returns model[47] (assuming a β of one and α of zero) to estimate abnormal performance (Brown & Warner, 1985). The market-adjusted abnormal returns are calculated as follows:

$$ar_{it} = r_{it} - r_{ie} \quad (3)$$

Where

ar_{it} =abnormal return on share *i* on day *t* (where day *t* is the issuing day)[48],

r_{it}=return on share *i* on day *t*,

[45] Calculated as the raw market-to-book ratio at the end of the previous year divided by the median market-to-book ratio for all firms listed on the JSE at the end of the previous year.

[46] The regression models are analysed first using the returns over a 12-month period, and then repeated using the returns over a 36-month period.

[47] Despite the simplicity of this model, more complicated models have not necessarily proven more robust (Jones, Danbolt & Hirst, 2004).

[48] Henceforth, the two-day abnormal cumulative share return following the announcement is also examined.

r_{ie} =return on the JSE All Share Index on day *t*. Alternatively, this study uses: (1) the share's 10 day average return (prior to the announcement date); and (2) its pre-issue 10 day maximum return.

Then, two separate portfolios are formed for SEOs issuing during high-sentiment periods and those issuing during low-sentiment periods. The equally-weighted average abnormal returns of a portfolio of *n* shares on day *t* (where day t =0 is the issuing day) is calculated as follows:

$$AR_t = \frac{1}{n}\sum_{i=1}^{n} ar_{it} \quad (4)$$

Finally, the cumulative abnormal return (CAR) is calculated from day *k* to day *m* (the summation of the average abnormal returns within each portfolio):

$$CAR_{(k,m)} = \sum_{t=m}^{n} AR_t \quad (5)$$

The CARs of the high-sentiment portfolio and the low-sentiment portfolio are compared in order to test Hypothesis 4. *Ceteris paribus*, the high-sentiment portfolio is expected to have a significantly less negative CAR.

4.2.2.2 Regression Analysis

Subsequently, OLS regression analysis is undertaken in order to investigate the impact of both the firm characteristics and the announcement details, on the share's short-run performance following the SEO announcement:

$$ar_{it} = \alpha + \beta_1 YearsL_{i,t} + \beta_2 Qratio_{i,1-t} + \beta_3 IssueSize_{i,t} + \beta_4 size_{i,t} + \varepsilon_{i,t} \quad (6)$$

Where $ar_{i,t}$ is the abnormal return on share *i* at time *t*; $YearsL_{i,t}$ is the number of years that firm *i* has been listed at time *t*; $Qratio_{i,1-t}$ is a dummy variable (which is equal to 1 if firm *i*'s Tobin's Q-ratio, the year prior to announcing the SEO, exceeds 1, and zero if not); $IssueSize_{it}$ represents the size of the issue relative to the size of firm *i* at time *t*; and $Size_{it}$ is the size of firm *i* at time *t*. ε_{it} is the error term.

Furthermore, a correlation matrix, condition indexes, as well as the Durbin-Watson statistic, are generated to test for correlation and multi-collinearity between the explanatory variables.

4.2.3 Long-run Effects (Long-run Performance)

Firstly, the performance of SEO firms are compared to that of non-issuing matching firms in order to examine whether issuing firms underperform on the JSE (Hypothesis 2). Secondly, the effect of investor sentiment on long-run performance is examined (Hypothesis 5).

4.2.3.1 Matching Procedure

In line with previous literature, the matching procedure is based on both size and the market-to-book ratio and closely resembles the methodology undertaken in Ritter (2003). A size-match is attained by matching the issuing firm to a non-issuing firm that is closest in size. Alternatively, a style-match is attained by matching an issuing firm to a non-issuing firm that is in the same size decile and that has the closest market-to-book ratio. These matching firms are included for the entire five-year holding period unless they are delisted or issue equity, in which case a new match is drawn from the initial candidates described above. If a firm issues equity more than once during a five-year period, only its first equity issue is considered[49]. A non-issuing firms is defined as a firm that has not issued equity in the last five years.

4.2.3.2 Benchmark Selection and Comparing the Market-based Performance

Firstly, the performance of issuing and non-issuing firms is measured by using the simple holding-period returns approach. The equally-weighted buy-and-hold returns (BHRs) are calculated as follows:

$$BHR = \frac{1}{N}\sum_{i=1}^{N}\left[\prod_{t=\tau_i}^{T_i}(1 + R_{it}) - 1\right] \times 100 \qquad (7)$$

Where N is the number of shares in a portfolio, R_{it} is the return of share i over month t, and T_i is the effective holding period for share i (which is measured in 1-year, 3-year, and 5-year holding periods, or until the SEO is delisted). For robustness, a value-weighted approach is also examined for all measures of long-run share performance.

[49] The results of this study are robust to the exclusion of firms making multiple announcements within a five year period.

The comparative share performance is then calculated as the difference in BHRs for issuers and their matching firms. This seems to be the most popular method of comparing performance of issuing and non-issuing firms. However, for robustness the calculation and comparison of the equally-weighted buy-and-hold abnormal returns (BHARs) of issuing and non-issuing firms are also examined:

$$BHAR = \frac{1}{N}\sum_{i=1}^{N}\left[\left(\prod_{t=\tau_i}^{T_i}(1 + R_{it})\right) - \left(\prod_{t=\tau_i}^{T_i}(1 + R_{mt})\right)\right] \quad (8)$$

Where R_{mt} is the market return over month t[50], or alternatively, it is the expected return for share i in month t (Er_{it}) as calculated using the CAPM:

$$Er_{it} = Rf_t + \beta_i\,(R_{mt} - Rf_t) \quad (9)$$

Where Rf_t, represents the returns for the risk free asset in month t[51], and β_i represents the sensitivity of share i relative to the market (commonly referred to as systematic risk).

Finally, to test whether investor sentiment has an effect on the performance of SEO firms (Hypothesis 5), the BHRs and BHARs of the high-sentiment portfolio are compared with that of the low-sentiment portfolio.

4.2.3.3 Comparing Operating Performance

The operating performance of issuing- and non-issuing firms are compared over a period of five years using a Wilcoxon Matched-Pairs Signed-Ranks test in order test for differences in distributions. For studies investigating operating performance, it is common to report the median values of accounting ratios, given the skewness of these accounting ratios (DeAngelo, 1988).

Thus, operating performance is measured as the median year on year percentage change using the following popular measures of operating performance: (1) return on assets (ROA); (2)

[50] The JSE All Share Total Returns index (J203T) is used to proxy the returns of the market portfolio.
[51] The 3-month South African Treasury bill is used as the proxy for the risk-free rate.

earnings per share (EPS); and (3) return on equity (ROE)[52]. Operating performance is tested across, one-, three-, and five-year periods.

4.2.4 Robustness Checks for Long-run Share Performance

For robustness, the examination of the long-run share performance following SEOs is also examined using the calendar-time portfolio approach (Fama, 1998; Mitchell & Stafford 2000). This approach is be applied for: (1) comparing the long-run abnormal share performance of issuing firms and non-issuing firms; and (2) comparing the performance of issuing firms that conducted their SEOs during periods of high-investor sentiment *vis-à-vis* the firms conducting SEOs during periods of low-investor sentiment.

4.2.4.1 Measuring Long-run Abnormal Share Performance

Every month the issuing and non-issuing portfolios are reformed, taking into consideration all the firms that have conducted SEOs in the last 3, 4 or 5 years and their non-matching counterparts. Every month, firms that have issued new shares in the last 3, 4, or 5 years are added to the issuing portfolio, while firms that have not conducted SEOs in those timeframes are excluded[53]. Likewise, non-issuing firms are added (or dropped) from the non-issuing portfolio on a monthly basis subject to the inclusion (or exclusion) of their issuing counterparts from the issuing portfolio. A zero-investment portfolio is then also formed, which is equivalent to buying the issuing portfolio and shorting (or selling) the non-issuing portfolio. The abnormal returns of these portfolios, as specified by the application of the CAPM, are the intercepts of the following regressions:

$$ExcRet_{p,t} = a + b\left[R_{mt} - R_{ft}\right] + e_t \qquad (10)$$

Where

- $ExcRet_{SEO,t} = R_{SEO,t} - R_{ft}$
- $ExcRet_{Match,t} = R_{Match,t} - R_{ft}$
- $ExcRet_{SEO\text{-}Match,t} = R_{SEO,t} - R_{Match,t}$

[52] EPS is calculated as the profits attributed to ordinary shareholders divided by the number of ordinary shares outstanding. ROA is calculated as the earnings before interest, tax, depreciation and amortisation (EBITDA) divided by total assets. ROE is calculated as EBITDA divided by the total book value of equity.
[53] Henceforth, these three time periods are also referred to as issuing window periods.

Furthermore, $R_{SEO,t,}$ and $R_{Match,t}$ represent the monthly returns on the issuing portfolio and the non-issuing portfolio at time *t*, respectively[54]. R_{mt} is the market return in month *t*, and R_{ft} is the risk free rate in month *t*. A reminder that the intercept, *a*, measures abnormal performance and is comparable to measuring Jensen's alpha (Brav, Geczy & Gompers, 2000). e_t is the error term. For additional robustness, the portfolio returns are evaluated using both an equally-weighted and a value-weighted approach.

4.2.4.2 Evaluating the Influence of Investor Sentiment on Long-run Share Performance

Every month, the low-sentiment and the high-sentiment portfolios are reformed, taking into account all the firms that have conducted SEOs in the last 3, 4, or 5 years. Every month, firms that have performed SEOs in the last 3, 4, or 5 years are added to the relevant portfolio with respect to investor sentiment at the time of issuing, while firms that have not conducted SEOs in those timeframes are dropped. The zero-investment portfolio is then formed using the CAPM to estimate the abnormal returns of this portfolio[55]:

$$R_{pt} = R_{Ht} - R_{Lt} = a + b\left[R_{mt} - R_{ft}\right] + e_t \qquad (11)$$

Where R_{pt} is the return of the zero-investment portfolio in month *t*, R_{Ht} is the return of the high-sentiment portfolio in month *t*, R_{Lt} is return on the low-sentiment portfolio in month *t*, R_{mt} is the market return in month *t*, and R_{ft} is the risk free rate in month *t*. The intercept, *a*, measures the effect of sentiment on the long-run share performance after SEOs. *Ceteris paribus*, a negative intercept is expected, indicating that firms conducting SEOs during high-sentiment periods experience more severe long-run underperformance in comparison to firms conducting SEOs during low-sentiment periods. For added robustness, the portfolio returns are evaluated using both an equally-weighted and a value-weighted approach.

[54] Separate, non-issuing portfolios are formed for firms matched using both the size-matching and the style-matching approach.

[55] In this case, the zero-investment portfolio is equivalent to going long in the high-sentiment portfolio and shorting the low-sentiment portfolio.

4.3 Limitations

The main limitation of this study, when compared to the international body of research, is the restricted sample size. There are significantly less companies that are listed on the JSE, when compared to the major US stock exchanges. Therefore, it is a natural progression that comparatively, there are less SEO announcements used in this study. This relatively small sample size prevented attempts to further categorise announcements based on the stated use of funds and the announcing firm's industry. Furthermore, the robustness of many statistical tests may be weakened as sample size decreases. Despite this limitation, the sample size used in this study is similar to the sample sizes used in other South African studies of IPOs, and is large enough to produce credible results with multiple robustness measures put into place to improve the reliability of the findings.

Nonetheless, these limitations leave room for improvement and highlight potential avenues for future research. Categorising announcements based on the intended use of funds could provide important insight to the performance of SEOs and the market's initial reaction to the SEO announcement. In future, more attention should also be focused towards examining the post-issue risk patterns of SEO firms in light of the literature documenting the reduced risk of SEO firms following issuance. For instance, Lyandres, Sun and Zhang (2005) find that issuing-firms tend to have lower liquidity betas, and Carlson, Fisher and Giammarino (2006) show that using a dynamic beta approach led to SEO underperformance disappearing. Due to the extensive nature of the comprehensive tests undertaken in this study these avenues of research were not pursued, leaving room for future exploration. Understanding the post-SEO risk patterns in the South African context would greatly assist managers in their capital structure decision process.

4.4 Summary of the Methodology

This chapter aims to outline the methodology undertaken in this study, whilst also making note of the important limitations encountered during the analysis conducted. Firstly, an event study, as well as regression analysis are undertaken in order to analyse the market's initial reaction to the announcements of SEOs. Secondly, the long-run financial and operating performance of

SEOs are analysed, with an important emphasis placed on analysing the influence of investor sentiment on the long-run performance of SEOs. Finally, factor regression analysis is undertaken as a robustness measure to the analysis on the long-run financial performance of SEOs. The main limitations to the empirical framework of this study are attributed to the restricted sample size and the general shortage of information conveyed in the SEO announcements.

5 Results

The results are divided into four main sections. The first section examines the market's reaction to SEO announcements, in addition to exploring the potential influences on the market's reaction to these announcements. The second section explores the influence of investor sentiment, and other explanatory variables, on the probability of a firm conducting a SEO. The third section explores the differences in the long-run returns of issuing firms *vis-à-vis* non-issuing firms, as well as the impact of investor sentiment on these long-run returns. Finally, the fourth section, examines the differences in the long-run operating performances between issuing firms and non-issuing firms, and the impact of investor sentiment on the operating performance of issuing firms.

5.1 Investor Sentiment and the Probability of SEOs

5.1.1 The Summary Statistics

Figure 1 shows the annual investor sentiment plotted against the median investor sentiment from 1998 to 2015, with points above (below) the median indicating periods of high (low) investor sentiment[56]. An interesting, expected pattern emerges with investor sentiment peaking prior to the 2008 global financial crisis, followed by a sharp descent illustrating the spill-over effect of the US housing crisis. This is followed by a gradual 'recovery' of investor sentiment in South Africa. This is a clear illustration that investor sentiment is not only driven by conditions in the domestic economy, but by international events. While anomalous events may cause exaggerated spikes and declines in investor sentiment that has the potential to skew results, an aim of this study is to examine the impact of investor sentiment on the performance of SEO firms. Therefore, by controlling for investor sentiment, the results of this study provide an added layer of reliability.

[56] A similar approach to defining periods of high- and low-investor sentiment was undertaken by DeAngelo *et al.* (2010), and Chou and Lin (2015). Median values are commonly used due to the skewness of the annual investor sentiment index data.

Figure 1: The investor sentiment index



The summary statistics for investor sentiment, prior market-adjusted share returns, future market-adjusted share returns, standardised market-to-book ratios, and the years listed are presented in Table 1. The mean and median of the investor sentiment index are both relatively close to one, indicating that investor sentiment is slightly tending toward higher levels during the sample period. All else considered, a mean and median of zero, would have indicated that investor sentiment would not be inclining toward either high or low levels over the sample period. This illustrates the derived benefit of defining high- and low-investor sentiment periods as relative to the sample period, as opposed to assuming that the average investor sentiment levels are zero.

Table 1: Summary statistics

Variables	Mean	Median	Std.Dev	Skewness	Kurtosis	#Obs.
Sentiment index	1.084	0.857	1.089	1.435	2.844	18
Years listed	21.491	14.000	19.86	1.367	1.029	2835
Standardised M/B ratio	2.561	1.000	42.828	45.912	2339.36	2835
PriorRT12 (%)*	1.325	1.179	1.450	20.432	607.787	2835
PriorRT36 (%)*	2.132	1.431	3.075	7.380	79.694	2835
FutureRT12 (%)*	1.338	1.174	1.415	20.826	651.458	2835
FutureRT36 (%)*	2.140	1.522	2.965	7.939	90.834	2835

*Note: That all prior, and future share returns are calculated using the cumulative monthly returns of the entire window period.

The average age of the sample firms included in the logit regression is approximately 21.5 years, whilst future and past returns are fairly symmetric, indicating that any possible long-run SEO underperformance would not be attributed to market conditions. The extreme skewness and kurtosis of the variables used in the regression analysis fall in line with the relevant existing literature (Chou & Lin, 2015).

5.1.2 Regression Analysis

Table 2, which shows the correlation between the explanatory variables used in the regression analysis, reveals no worrying patterns of high correlation between these variables[57]. The strongest correlations are between the prior 12- and 36-month abnormal returns, as well as the future 12- and 36-month abnormal returns, which is entirely expected as these variables overlap for the initial 12 months. All other variables display relatively low levels of correlation.

[57] These results are confirmed in separate analysis of the condition indexes in addition to conducting the Durbin-Watson test. Furthermore, the four individual variables that are used to construct the investor sentiment index, also display relatively low correlation with the other explanatory variables of the logit regression models as shown in Section 1 of the Appendix.

Table 2: Correlation matrix for the logit regression models

	I.Sent	Age	Prior12	Prior36	future12	future36	Std. M/B
I.Sent	1.000						
Age	0.019	1.000					
Prior12	-0.005	-0.036	1.000				
Prior36	0.162	-0.039	0.433	1.000			
future12	-0.091	-0.034	-0.013	-0.040	1.000		
future36	-0.077	-0.082	-0.011	-0.055	0.479	1.000	
Std. M/B	0.022	-0.027	0.044	0.087	0.079	-0.010	1.000

Table 3: Regression analysis on the decision to conduct SEOs

	Intercept	Investor sentiment	M/B ratio	Prior share return	Future share return	Years listed
Regression A: All firms with 12-month prior and future returns						
Coefficient	-2.023***		-0.009	-0.289	-1.477***	
Regression B: All firms with 36-month prior and future returns						
Coefficient	-2.846***		-0.002	-0,021	-0.765***	
Regression C: All firms with years listed included (with 12-month prior and future returns)						
Coefficient	-1.805***		-0.008	-0.268	-1.377***	-0.019**
Regression D: All firms with years listed included (with 36-month prior and future returns)						
Coefficient	-2.499***		-0.002	-0.023	-0.724***	-0.021**
Regression E: All firms with investor sentiment included (with 12-month prior and future returns)						
Coefficient	-1.411***	0.048	-0.004	-0.117	-0.533***	
Regression F: All firms with investor sentiment included (with 36-month prior and future returns)						
Coefficient	-1.752***	0.071	-0.001	-0.017	-0.259***	
Regression G: All firms with investor sentiment and years listed included (with 12-month prior and future returns)						
Coefficient	-2.007***	0.121	-0.009	-0.286	-1.293***	-0.020**
Regression H: All firms with investor sentiment and years listed included (with 36-month prior and future returns)						
Coefficient	-1.607***	0.076	-0.001	-0.018	-0.249***	-0.009**

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

Table 3 reports the regression analysis surrounding the decision to conduct SEOs. Similar to the findings of Chou and Lin (2015), the probability of a firm conducting a SEO is significantly negatively related to the number of years listed and the future share return. This falls in line

with the international evidence suggesting that firms conducting SEOs underperform with regards to future share returns (Loughran & Ritter, 1995). Moreover, the implication of younger firms being more likely to conduct SEOs fits the narrative of the market timing theories, which suggest that the shares of younger firms are more susceptible to misvaluations, ultimately increasing the incentive to issue shares.

Contradictory to the popular market timing explanation, regressions A to H indicate that there does not seem to be any significant relationship between either a firm's market-to-book ratio, or a firm's prior abnormal share return, and the probability that a firm conducts a SEO. In fact, there appears to be a negative, albeit non-significant relationship between these variables. Therefore, there does not appear to be any signs that the firms conducting SEOs are attempting to take advantage of high market valuations or previously high abnormal returns.

As shown in the results of regressions E to I, investor sentiment has a positive, but insignificant influence on the probability of a firm conducting a SEO. Although there are more SEOs during high-investor sentiment periods compared to low-investor sentiment periods (as shown in Table 8 further below), investor sentiment does not appear to be significantly influencing management's decision to issue new shares.

One imperative consideration to make when analysing the results in this section, is the significantly smaller proportion of firms conducting SEOs in South Africa, relative to both the total general populous of listed firms in South Africa, and the number of firms conducting SEOs in the US. To put this into context, the sample in this study includes 152 SEO announcements compared to the 2,835 total firm-year observations included in the logit regressions. Thus, the small sample size would naturally present a challenge to finding any significant results in the logit regression analysis. This point is further illustrated by the unreported, low R-squared values across all eight regression models, indicating the inadequacies of the explanatory variables in explaining a firm's decision on whether or not to

conduct a SEO[58]. Therefore, the decision to issue equity is poorly explained by the explanatory variables used in all 8 regression models.

In summary, although it would make sense that more corporate activity takes place during periods of high-investor sentiment, there is no significant evidence that firms conducting SEOs are attempting to time the market. This contradicts the market timing theory and the findings of previous international literature that analyse the relationship between investor sentiment and SEOs (DeAngelo *et al*., 2010; Chou & Lin, 2015). These results were hindered by restrictions in the sample size.

5.2 The Stock Market's Reaction to SEO Announcements

5.2.1 Event Study Analysis

The sample covers 152 SEO announcements made by 79 firms, with 81 announcements occurring during periods of high-investor sentiment in contrast to the 71 announcements occurring during periods of low-investor sentiment (as reported in Table 8 further below). Further analysis of the sample and its observable patterns are discussed in subsequent sections, with this section focusing on the market's reaction to the SEO announcements.

[58] R-squared values range from 4 to 6 %, indicating an extremely poor explanatory model.

Table 4: The stock market's reaction to SEO announcements

	Mean	Median	#Obs.	Std.Dev	Neg. /Pos.
1-day raw return	-0.027***	-0.017***	152	0.042	108/13
2-day cumulative raw return	-0.026***	-0.009***	152	0.090	86/41
1-day abnormal return	-0.027***	-0.015***	152	0.041	130/22
2-day cumulative abnormal return	-0.026***	-0.012***	152	0.090	101/51

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

Table 4 reports the results of the share price movements in response to the SEO announcements. The average actual return and abnormal return on the day of the SEO announcement are both -2.7%. Moreover, in line qualitatively and quantitatively with the findings of Ritter (2003), the average two-day cumulative abnormal return following a SEO announcement is -2.6%. The market reacts in a similarly negative fashion when measuring the one-day abnormal share returns as well as the actual cumulative two-day share returns following the SEO announcement. Across the four measures used, it is clear that the majority of SEO announcements are met with a negative response from the market as illustrated by the last column in Table 4.

In further support of these findings, the median values are also significantly negative across the board. Overall, these findings are in line with the adverse selection model developed by Myers and Majluf (1984) predicting a negative share price reaction to SEO announcements, adding to the vast amount of confirmatory international evidence. These findings are robust to the different measures of abnormal returns used in this study[59].

[59] As shown in Section 2 of the Appendix.

5.2.2 Industry Analysis

An industry break-down of the announcements, as illustrated in Figure 2, reveals that 43 out of the 79 firms (54.43%) included in the sample fall under the basic materials sector. Mining firms have come under severe pressure in more recent years due to falling commodity prices and other significant events, such as the heavy protests in South Africa led by trade unions. These considerations could influence the results of this study, considering that investors could potentially react even more negatively to SEO announcements made by firms belonging to the basic material sector given the poor recent performance of the mining industry in general.

Figure 2: Industry representation of the firms in the sample

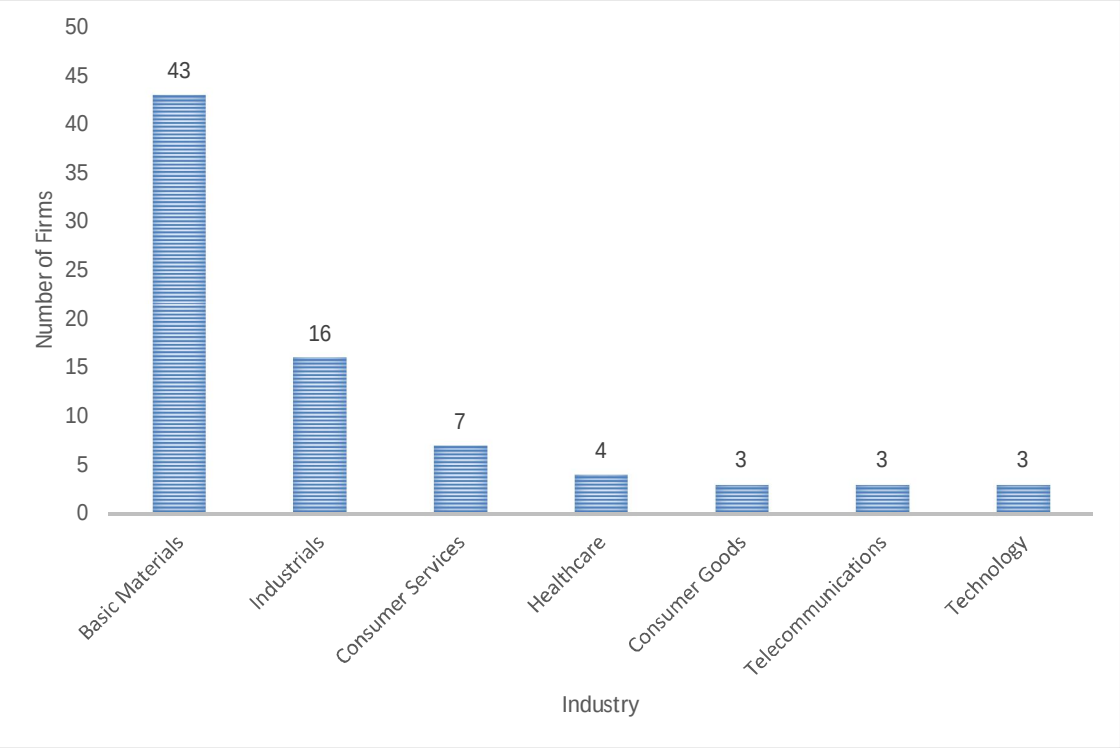


Table 5 compares the stock market's reaction to SEO announcements made by firms belonging to the basic materials sector, to that of firms belonging to other sectors. The analysis illustrates the virtually identical market reaction to announcements made by firms belonging to either category. Despite the market reacting slightly more negatively to basic material SEO firms, as measured by the two-day abnormal cumulative returns, there are no significant differences in the market's reaction to SEO announcements made by these two distinct categories of firms across the board (as illustrated in column 6).

Table 5: Comparative industry performance

	Basic Materials (1)	# Obs.	Other Sectors (2)	#Obs.	Difference (1)-(2)
1-day raw return	-0.026***	96	-0.028***	56	0.002
2-day cumulative raw return	-0.027***	96	-0.024***	56	-0.003
1-day abnormal return	-0.027***	96	-0.027***	56	0.000
2-day cumulative abnormal return	-0.028***	96	-0.022***	56	-0.006

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

Due to the restricted sample size, a further industry breakdown would not yield any reliable results. However, this simple industry breakdown into two categories makes an important contribution to the overall results of the earlier event study analysis, by demonstrating that the results are not skewed by the substantial presence of the basic materials sector. The market generally seems to react negatively to SEO announcements in virtually equal magnitudes, whether a firm belongs to the basic materials sector or not.

This result is not completely unexpected, considering that the sample period covers a wide range of years where mining firms did not always necessarily perform poorly. In fact, the declining performance of the mining sector is more a recent trend, with the sector performing extremely well in certain preceding periods.

5.2.3 Regression Analysis

This section attempts to better understand and explain the market's generally negative reaction to SEOs. The correlation matrix, shown in Table 6, reports no worrying patterns of high correlation between the explanatory variables included in the regression analysis. This is confirmed by separate analysis of the Durbin-Watson test and the condition indexes.

Table 6: Correlation matrix for the event study regression models

	Size of firm	*Years listed*	*Issue size relative to firm size*	*Tobin's Q*
Size of firm	1.000			
Years listed	0.060	1.000		
Issue relative to size	-0.030	-0.037	1.000	
Tobin's Q	-0.049	-0.176	0.016	1.000

Table 7 reveals the results of the regression analysis. Across the four regressions, there is no confirmatory evidence that markets react more negatively to SEO announcements conducted by younger firms (firms that have been listed for less years on the JSE). Similarly, the market's reaction does not seem to be significantly influenced by either the size of a firm or by the relative issue size, with all the above mentioned coefficients insignificant and approximately equal to zero. As expected, there is a slightly positive relationship between the market's reaction to the SEO announcements and the Tobin's Q-ratio of the issuing firm (which is a proxy for the perceived quality of a firm's investment opportunities). However, the coefficient is also insignificant across all four regression models.

Table 7: Event study regression analysis

	Intercept	**Years listed**	**Q-ratio**	**Issue size**	**Size**	**R^2**
Regression 1: 1 day actual return						
Coefficient	-0.031***	0.000	0.006	0.000	0.000	0.010
Regression 2: 2 day actual cumulative return						
Coefficient	-0.025	0.000	0.003	0.000	0.000	0.022
Regression 3: 1 day abnormal return						
Coefficient	-0.032***	0.000	0.009	0.000	0.000	0.037
Regression 4: 2 day abnormal cumulative return						
Coefficient	-0.026	0.000	0.003	0.000	0.000	0.060

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

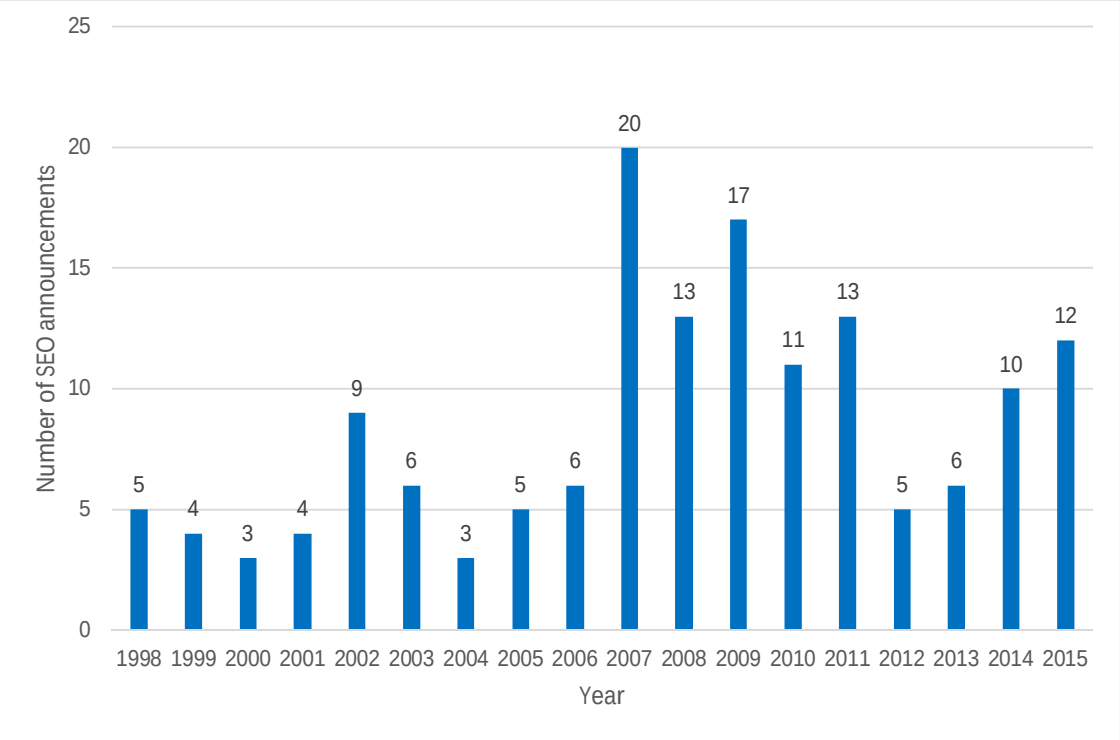
The failure of the four regression models to find any significant relationships between the market's reaction to the SEO announcements and the popular explanatory variables set-out by previous literature, is further highlighted by the extremely low R-squared values across the

regression models. These findings are in line with the results of Barclay and Litzenberger (1988), who also reported that neither the issue size nor the expected profitability of a firm's planned investments (also measured using Tobin's Q-ratio) had any significant influence on SEO announcement effects.

Overall, the results indicate that none of the proposed explanatory variables display any significant influences on the market's reaction to SEO announcements. In fact, these variables perform poorly in attempting to explain the market's reaction. The relative issue size, age of the firm, size of the firm, and the firm's Tobin's Q-ratio do not significantly impact the market's reaction to the SEO announcement. None of these variables appear to either mitigate or exacerbate the market's generally negative perception of SEO announcements[60].

5.2.4 Investor Sentiment and SEO Announcements

Figure 3: SEO announcements across the sample period



[60] These results are robust to a backward-elimination stepwise regression approach, where the most insignificant variables are removed from the regression models before repeating the analysis.

As illustrated in Figure 3, the annual amount of SEO announcements issued peaked in 2007 and remained relatively high for the following few years. Despite the obvious peak in 2007 and a few other high (low) issue periods which coincide with high (low) investor sentiment periods, there seems to be a reasonably stable flow of announcements across the years, irrespective of investor sentiment. No clear-cut pattern emerges to reliably signal that the peaks and troughs in issuing activity are undeniably influenced by investor sentiment. For example, the second highest period of SEO announcements occurred in 2009, a period corresponding to low-investor sentiment. Figure 3 is a near perfect illustration confirming the earlier results found in Section 5.1.2 which failed to establish a significant relationship between investor sentiment and the probability of a firm conducting a SEO. Nevertheless, there are more SEO announcements during periods of high-investor sentiment (81) relative to the announcements made during periods of low-investor sentiment (71), as seen in Table 8 below.

Table 8: Investor sentiment and the stock market's reaction to SEO announcements

	SEOs during high-sentiment periods (1)	**# Obs.**	**SEOs during low-sentiment periods (2)**	**#Obs.**	**Difference (1)-(2)**
1-day raw return	-0.027***	81	-0.026***	71	-0.001
2-day cumulative raw return	-0.022***	81	-0.030***	71	0.008
1-day abnormal return	-0.026***	81	-0.027***	71	0.001
2-day cumulative abnormal return	-0.021***	81	-0.031***	71	0.010

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

Table 8 reports the difference in share price movements for firms issuing during different periods of investor sentiment. *Ceteris paribus*, it is expected that the stock market would react less negatively to SEO announcements during periods of high-investor sentiment (Hypothesis 4). However, the results find no significant differences between the share price movements of

firms conducting SEOs during periods of low-investor sentiment *vis-à-vis* firms conducting SEOs during periods of high-investor sentiment.

Although firms conducting SEOs during high-sentiment periods do, on average, experience a less negative two-day abnormal cumulative return of approximately 1% when compared to their low-sentiment period counterparts, this difference is insignificant. These results are confirmed when analysing the alternative measures of abnormal share price returns, with no indication of any significant differences across the board. The market does appear to react slightly less negatively to SEO announcements made during periods of high-investor sentiment in terms of magnitude (with exception of the one-day actual raw returns). However, none of these differences are significant.

In summary, investor sentiment does not appear to significantly influence the short-run performance of firms conducting SEOs. Contradictory to predictions set forth by the market timing theory, the market does not appear to react significantly less negatively to the SEO announcements made during periods of high-investor sentiment. These results fail to establish the added incentive of issuing SEOs during periods of high-investor sentiment, as documented in the previous international literature (Chou & Lin, 2015).

5.3 Long-run Share Performance

5.3.1 Long-run Returns

The 'new issues puzzle' describes the debatable, arguably inexplicable long-run underperformance of issuing firms when compared to non-issuing firms: A puzzle that has attracted world-wide attention, but has been largely ignored in the South African context - until now.

5.3.1.1 Buy-and-Hold Returns

Tables 9 and 10 report and compare the long-run buy-and-hold returns of issuing firms and non-issuing firms (based on both size- and style-matching procedures) across one, three, and

five year intervals, using an equally-weighted and value-weighted approach, respectively. The sample size is notably reduced from the initial 79 issuing firms included in the event study and varies across the different share price performance measures and time horizons due to three reasons. Firstly, a proportion of issuing firms delisted during the course of the five-year period after conducting the SEO[61]. Secondly, the timing of the announcement restricts certain firms from being included in the long-run analysis. For example, firms conducting SEOs during 2015 are included in the event study analysis, but were naturally excluded from the long-run performance analysis. Thirdly, in search of the upmost credibility in results, outliers are removed from the sample[62].

Table 9: Equally-weighted long-run buy-and-hold returns

	Issuing firms (1)	**#Obs.**	**Non-issuing firms (2)**	**#Obs.**	**Difference (1)-(2)**
Panel A: Size-match					
1 year	-0,124	61	0.065	61	-0.189**
3 years	-0,098	52	0.586	52	-0.684***
5 years	-0,318	39	1.377	39	-1.695***
Panel B: Style-match					
1 year	-0.124	61	0.057	61	-0.181**
3 years	-0.098	52	0.457	52	-0.555***
5 years	-0,318	39	0.802	39	-1.120***

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

Firstly, the equally-weighted buy-and-hold returns, as shown in Table 9, are discussed. Panel A of Table 9 reports the results of issuing firms relative to their non-issuing counterparts matched on the basis of size (size-matches). On average, an investor would lose 12.4% after one year of investing in the shares of an issuing firm, compared to making a positive return of 6.5% by investing in the shares of a non-issuing firm instead (representing a significant 18.9% difference in absolute terms) . The significant underperformance of issuing firms becomes more pronounced as the time-horizon is increased, with a staggering 169.5% difference in average buy-and-hold returns over a five-year period.

[61] Delisted firms were included in the sample in order to avoid survivorship bias. However, their performance was only measured prior to the delisting.
[62] The main findings of this study are robust to the inclusion of the outliers as shown in Sections 3 and 4 of the Appendix.

Panel B of Table 9, reports the results of issuing firms relative to non-issuing firms matched on the basis of both size and market-to-book ratios (style-matches). There is still significant underperformance of issuing firms relative to non-issuing firms that intensifies across broader time horizons. However, in line with the findings of Ritter (2003), applying this more comprehensive matching procedure slightly reduces the magnitude of the underperformance. Thus, it can be implied that matching firms on the basis of size and market-to-book ratios, rather than just size, helps to a certain extent in explaining the differences in returns.

For example, the average one year buy-and-hold return remains -12.4% for issuing firms compared to the average one year buy-and-hold return of 5.7% for the non-issuing, style matched firms (revealing a slightly less, but still significant, difference of 18.1% in absolute terms). The differences in the average buy-and-hold returns over three-, and five-year periods between issuing and non-issuing firms are also reduced in comparison to the findings in Panel A, but remain substantial and significant.

Table 10: Value-weighted long-run buy-and-hold returns

	Issuing firms	**#Obs.**	**Non-issuing firms**	**#Obs.**	**Difference (1)-(2)**
Panel A: Size-match					
1 year	-0.984	53	-0.979	53	-0.005
3 years	-0.988	45	-0.976	45	-0.012
5 years	-0.974	35	-0.940	35	-0.034
Panel B: Style-match					
1 year	-0.984	53	-0.985	53	0.001
3 years	-0.988	45	-0.983	45	-0.005
5 years	-0.974	35	-0.928	35	-0.046

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

The value-weighted buy-and-hold return analysis, shown in Panels A and B of Table 10, provides no significant evidence of the underperformance of issuing firms, when compared to either their size-, or style-matched counterparts. Across all three time horizons, there is no significant differences between the performance of issuing firms and their non-issuing

counterparts. Although issuing firms did typically experience slightly lower returns than non-issuing firms as illustrated by the generally negative differences reported in the last column[63], none of these differences are significant. Furthermore, the relative underperformance of issuing firms is vastly reduced in magnitude when compared to the results reported in Table 9. For instance, issuing firms only underperform by 4.6% over a five-year period compared to style-matched, non-issuing firms when using a value-weighted approach[64]. These findings are consistent with the findings of Hertzil and Li (2010), who found that using a value-weighted approach of measuring market performance, as opposed to an equally-weighed approach, attenuated the underperformance of SEOs firms. With exception of the five-year window period, using the style-matching procedure instead of the size-matching procedure, again helps in reducing the magnitude of the difference in returns between issuing firms and their non-issuing counterparts.

Overall, this evidence illustrates the significant long-run share underperformance of issuing firms relative to non-issuing firms when comparing equally-weighted buy-and-hold returns, which is consistent with the existing literature. These results are consistent across one-, three-, and five-year intervals and holds for both the size-, and the style-matching procedures. In contrast, the magnitude of underperformance is severely reduced and becomes insignificant when using a value-weighted approach of measuring share performance. The fact that the equally-weighted results are, on average, more significant and of a greater magnitude than the value-weighted results, implies that the phenomenon of issuing firm underperformance is possibly more prominent for smaller firms. Moreover, using a style match appears to typically reduce the relative underperformance of issuing firms vis-a-vis non-issuing firms, to a certain extent.

5.3.1.2 Buy-and-Hold Abnormal Market Returns

Tables 11 and 12 report and compare the long-run buy-and-hold abnormal market returns of issuing firms and non-issuing firms (based on both size-, and style-matching procedures) across one, three, and five year intervals, using an equally-weighted and a value-weighted approach,

[63] With exception of the insignificant, positive difference in the one-year buy-and-hold returns of issuing firms vis-à-vis their style-matched counterparts.
[64] Again, this underperformance is not significant.

respectively. The market returns are used as a benchmark to compare the performance of these portfolios.

Table 11 shows the results of the equally-weighted analysis and produces similar results to the results in Table 9 above. There is a clear indication of issuing firm underperformance across all three different time horizons. The underperformance is robust to both matching portfolio procedures and grows rapidly as the time horizon is broadened. With exception of the average three-year buy-and-hold abnormal market returns, introducing the style match procedure helps to reduce the magnitude, but not the significance, of the issuing firm underperformance.

Table 11: Equally-weighted long-run buy-and-hold abnormal market returns

	Issuing firms	**#Obs.**	**Non-issuing firms**	**#Obs.**	**Difference (1)-(2)**
Panel A: Size-match					
1 year	-1.163	63	-0.939	63	-0.224***
3 years	-1.359	53	-0.671	53	-0.688***
5 years	-1.663	40	-0.422	40	-1.241***
Panel B: Style-match					
1 year	-1.163	63	-0.952	63	-0.211***
3 years	-1.359	53	-0.546	53	-0.813***
5 years	-1.663	40	-0.616	40	-1.047***

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

Table 12 demonstrates the robustness of issuing firm underperformance to the use of a value-weighted approach of measuring share performance. Across all three time horizons, issuing firms significantly underperform when compared to either their size-, or style-matched counterparts. Once again, these results illustrate the attenuating effect of the style-matching procedure on SEO underperformance. Notably, the magnitude of the SEO underperformance is massively reduced in comparison to the results of the equally-weighted approach reported in Table 11, again implying that SEO underperformance is more prominent for smaller firms.

Table 12: Value-weighted long-run buy-and-hold abnormal market returns

	Issuing firms	#Obs.	Non-issuing firms	#Obs.	Difference (1)-(2)
Panel A: Size-match					
1 year	-1.001	39	-0.999	39	-0.002***
3 years	-1.002	39	-0.997	39	-0.005***
5 years	-1.005	29	-0.987	29	-0.018***
Panel B: Style-match					
1 year	-1.001	39	-1.000	39	-0.001**
3 years	-1.002	39	-0.999	39	-0.003***
5 years	-1.005	29	-0.996	29	-0.009***

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

In summary, the two most popular measures of long-run share performance in the SEO literature[65] both provide evidence that issuing firms generally underperform relative to non-issuing firms for periods of up to five years following the issue. Whilst the evidence fits the general consensus surrounding the SEO literature, this begs the question on whether these patterns are explained by risk. Although the sheer magnitude of SEO underperformance reported when using an equally-weighted approach presents an interesting eccentricity in the South African context, the value-weighted approach to measuring share performance reveals only slight, if any, underperformance. These results imply that SEO underperformance is more pronounced for smaller firms.

5.3.1.3 Buy-and-Hold Abnormal Realised Returns

While the previous sections appears to point towards the existence of a 'new issues puzzle' in South Africa, the underperformance of issuing firms would only qualify as a 'puzzle' if the underperformance remains unexplained. This section attempts to explain the contrasting performance of issuing firms and non-issuing firms with the use of the Capital Asset Pricing Model.

Tables 13 and 14 report and compare the long-run buy-and-hold abnormal realised returns of issuing firms and non-issuing firms (based on both size-, and style-matching procedures) across

[65] Namely the buy-and-hold return approach and the buy-and-hold abnormal market return approach.

one, three, and five year intervals, using an equally-weighted and value-weighted approach, respectively. The share's actual returns are compared to their expected returns as implied by the CAPM.

Table 13: Equally-weighted long-run buy-and-hold abnormal realised returns

	Issuing firms	#Obs.	Non-issuing firms	#Obs.	Difference (1)-(2)
Panel A: Size-match					
1 year	-0.168	59	-0.196	59	0.028
3 years	-0.585	40	-0.477	40	-0.108
5 years	-0.850	34	-0.684	34	-0.166**
Panel B: Style-match					
1 year	-0.168	59	-0.295	59	0.127
3 years	-0.585	40	-0.652	40	0.067
5 years	-0.850	34	-0.570	34	-0.280

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

Panel A of Table 13, reports the results of issuing firms relative to their size-matched, non-issuing counterparts. There are no significant differences between the one-year and three-year equally-weighted buy-and-hold abnormal returns of issuing and non-issuing firms. However, issuing firms do significantly underperform *vis-à-vis* non-issuing firms on a 5-year basis. Over a five-year period, issuing firms earn, on average, 16.6% less than non-issuing firms in absolute terms.

Panel B of Table 13, reports the results of issuing firms relative to their style-matched, non-issuing counterparts. Any differences in the magnitude of the comparative performance of firms are not significant. In accordance to the previous findings in Sections 5.3.1.1 and 5.3.1.2, applying the style-matching procedure aids in better explaining the differences in comparative performances, with the results generating no significant differences between issuing and non-issuing firms. An interesting observation reported in Panel B, is that issuing firms in fact outperformed on average in comparison to their non-issuing counterparts across the one-, and three-year time periods. However, this outperformance was not significant.

Table 14: Value-weighted buy-and-hold abnormal realised returns

	Issuing firms	#Obs.	Non-issuing firms	#Obs.	Difference (1)-(2)
Panel A: Size-match					
1 year	-0.970	57	-0.969	57	-0.001
3 years	-0.981	46	-0.979	46	-0.002
5 years	-0.993	35	-0.979	35	-0.014
Panel B: Style-match					
1 year	-1.001	57	-0.979	57	-0.022
3 years	-1.002	46	-0.826	46	-0.176
5 years	-1.005	35	-0.973	35	-0.032

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

Both Panels A and B of Table 14, in line with the results reported in Table 13, fail to provide any evidence of SEO underperformance in either of the three time horizons when using a value-weighted approach of measuring share performance. Once again, the use of a value-weighted approach appears to attenuate the differences is share performance in the majority of cases. This result provides further credibility to the implication of the overall results that SEO underperformance appears to be more prominent in smaller firm. Fama (1998) argues that 'bad-model' problems are more severe when examining equally-weighted returns, since an equally-weighted approach gives more weight to small firms.

In summary, it appears that the underperformance of issuing firms, as described in the previous analysis, can be explained to some extent by market risk. By matching firms based on the recommended style-matching approach, there appears to be no significant differences in the comparative performance of issuing and non-issuing firms. Thus, the lower buy-and-hold returns described in the two previous sections could be due to the lower average market risk faced by issuing firms- possibly justifying their lower returns. The section demonstrates that including the CAPM in the analysis of share performance explains enough of the variation in comparative performances between SEO firms and non-issuing firms, to render the difference insignificant. Therefore, there does not appear to be a 'new issues puzzle' in the South African context when analysing the long-run share performance of issuing firms.

5.3.1.4 *A Comment on the CAPM and the Market Risk of SEOs*

In light of the existing evidence questioning the capability of the CAPM, this analysis explores the effectiveness of the CAPM in describing expected returns. Table 15, reports the significance of the abnormal performance experienced by issuing and non-issuing firms. The results demonstrate that the actual share returns significantly differ from their expected returns.

If the CAPM correctly predicted the expected returns of the shares, then the abnormal share returns should not significantly differ from zero. The results illustrate a clear deviation of actual returns from expected returns, on average, across all firm categories and time horizons. Only the average one-year buy-and-hold abnormal return of issuing firms is not significant at the 5% level or higher. In addition, the CAPM seems to overestimate the expected returns, with the abnormal returns on average being negative. The magnitude of the abnormal returns are also a cause for concern. For instance, issuing firms have an abnormal return of -85%, on average, over a five-year period.

Table 15: Significance of the equally-weighted long-run buy-and-hold abnormal realised returns

	Issuing firms	**Size-Match**	**Style-Match**	**#Obs.**
1 year	-0.168*	-0.196***	-0.295***	59
3 years	-0.585***	-0.477***	-0.652***	47
5 years	-0.850***	-0.684***	-0.570**	37

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

Although the CAPM has clear inadequacies in predicting and explaining the expected returns of the shares used in this study's sample, it sufficiently explains the differences in the buy-and-hold returns between issuing and non-issuing returns, to render these differences insignificant. The findings in Section 5.3.1.3 merely reflect the ability of the CAPM in describing the differences in returns between issuing and non-issuing firms. It is not a comment on the robustness of the CAPM as a measure of expected returns. This is an important distinction. In essence, the findings of this study simply demonstrates the ability of the CAPM in explaining the difference in returns between issuing and non-issuing firms. It is not a direct comment on the asset pricing environment in South Africa, nor does it imply that the CAPM is the most

effective asset pricing model in the South African context. Nonetheless, considering the simplicity of the CAPM and its adequate effectiveness in describing the return patterns of the firms included in this study's sample, an alternative, more complex asset pricing model was not tested in this study.

Table 16 shows the average market risk (Beta) of issuing firms over different time horizons. This brief analysis shows that the average market risk of SEOs decreases as the post-issue time horizon increases. These findings are in line with the main conclusions drawn by the rational theories that cite the argument that the risk of SEO firms decrease following the SEO, as a potential explanation for the underperformance of issuing firms (Carlson, Fisher & Giammarino, 2006).

Table 16: Issuing firm average beta analysis

	Pre-issue	**1 year average**	**3 year average**	**5 year average**
Issuing firm beta	1.581***	1.137***	0.833***	0.662***

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

5.3.2 The Effect of Investor Sentiment on Long-run Returns

Table 17 reports the differences in the equally-weighted long-run market performance of firms conducting SEOs during periods of high-investor sentiment vis-à-vis firms conducting SEOs during periods of low-investor sentiment. *Ceteris paribus*, the market timing theory predicts that firms that issue shares during periods of high-investor sentiment should demonstrate inferior post-issue share performance.

Table 17: Investor sentiment and equally-weighted long-run share performance

	SEOs during high-sentiment periods (1)	SEOs during low-sentiment periods (2)	Difference (1)-(2)
Panel A: Buy-and-hold returns			
1 year	-0.198	-0.010	-0.188*
3 years	-0.201	0.081	-0.282
5 years	-0.297	-0.352	0.055
Panel B: Buy-and-hold abnormal market returns			
1 year	-1.128	-1.218	0.090
3 years	-1.331	-1.408	0.077
5 years	-1.617	-1.740	0.123
Panel C: Buy-and-hold abnormal realised returns			
1 year	-0.112	-0.250	0.138
3 years	-0.541	-0.544	0.003
5 years	-0.827	-0.897	0.070

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

The only significant difference between the share performances of firms issuing during periods of high-investor sentiment, as opposed to firms issuing during periods of low-investor sentiment, is the difference in the one-year average buy-and-hold returns. In this instance, and as hypothesised, firms issuing during periods of high-investor sentiment experienced more severe long-run underperformance, with a difference in returns of -18.8% relative to low-sentiment issuers. However, this result is only significant at the 10% level.

In an overwhelming majority of the cases, there are no significant differences between firms conducting SEOs during the two distinct periods of investor sentiment. In addition to the insignificance of these differences, most of these differences are positive, in contrast to the hypothesised relationship between investor sentiment and the long-run share performance of SEOs. These results are confirmed when using a value-weighted approach of testing long-run share performance[66].

Furthermore, in separate analysis[66], investor sentiment does not influence the relative performance of issuing firms in comparison with non-issuing firms. Issuing firms do not

[66] As shown in Section 4 of the Appendix.

perform any worse or better, relative to non-issuing firms as a consequence of issuing in periods of low- or high-investor sentiment. This result is consistent across all three time horizons and across all three measures of share performance.

Thus, it can be sensibly concluded that investor sentiment does not appear to significantly influence the long-run share performance of SEOs. Although, it is important to point out that these tests of investor sentiment are where the limitations of the sample size are most strongly felt. Nonetheless, dividing the sample on the basis of investor sentiment still leaves enough observations in both investor sentiment categories to produce reliable results. These results do not support the predictions set out by the market timing theory.

5.3.3 Factor Regression Models (Robustness Check)

Given the documented difficulties in generating unbiased inferences when analysing buy-and-hold returns (Lyandres, Sun & Zhang, 2005), this study also makes use of factor regressions to investigate the long-run performance of SEO firms relative to their non-issuing counterparts. Furthermore, factor regression models are also implemented in order to investigate the influence of investor sentiment on the long-run share performance of SEO firms.

5.3.3.1 Testing Long-run Share Performance

Table 18 only reports the intercepts of the various factor regression models, as the focus of this analysis is on abnormal share performance, which is captured by these intercepts. The results reported show the use of a three-, four-, and five-year issuing window period to form the monthly portfolios[67]. Panel A, which reports the results using an equally-weighted approach of measuring the monthly portfolio performance, reveals that SEO firms earned significantly negative abnormal returns when limiting the issuing portfolio to issuing firms that have conducted SEOs in the prior three-, four-, and five-year issuing windows. For example, issuing firms earned on average, a monthly negative abnormal return of approximately -1.8% when using a five-year issuing window period to form monthly portfolio returns. Size-matched, non-

[67] As described in Section 4.2.4, the issuing window periods refer to the time period since issuance that allows for a share to be included in the monthly portfolio. For example, constructing the monthly returns of the issuing portfolio using a three-year issuing window period means that only the shares that have issued equity in the last three years are included in the issuing portfolio for that month.

issuing firms only showed significantly negative abnormal returns when limiting the portfolio to a five-year issuing window period, while style-matched, non-issuing firms showed no evidence of significant abnormal returns in any of the issuing window periods.

Comparing the performance of issuing and non-issuing firms as shown in the last two columns, reveals no significant evidence that issuing firms underperformed in comparison to either their size-, or style-matched counterparts in any of the three issuing window periods. Although SEO firms do appear to have lower returns, as shown by the negative intercepts throughout the final two columns, this underperformance is not statistically significant.

Table 18: Abnormal long-run share performance

Panel A: Intercepts (equally-weighted approach)					
	SEOs	Size	Style	SEOs relative to Size	SEOs relative to Style
3 year	-0.014**	-0.006	-0.004	-0.009	-0.011
4 year	-0.017**	-0.007	-0.004	-0.009	-0.013
5 year	-0.018***	-0.011**	-0.007	-0.008	-0.012
Panel B: Intercepts (value-weighted approach)					
	SEOs	Size	Style	SEOs relative to Size	SEOs relative to Style
3 year	-0.003	0.016**	0.005	-0.018*	-0.007
4 year	-0.006	0.018**	0.005	-0.025**	-0.017
5 year	-0.005	0.014*	0.004	-0.019**	-0.009

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

Panel B reports the results of using a value-weighted approach of measuring monthly portfolio performance. Both SEO firms, and their style-matched counterparts show no evidence of any significant abnormal returns in any of the issuing window periods. In contrast, size-matched, non-issuing firms showed significantly positive abnormal returns in all three issuing window periods[68]. Finally, SEO firms significantly underperformed relative to their size-matched counterparts in all three issuing window periods[69]. For example, issuing firms experienced, on

[68] Notably, the positive abnormal returns earned by the size-matched, non-issuing firms in the five-year issuing window period, is only significant at the 10% level.
[69] The relative monthly underperformance measured using a three-year issuing window period, is only significant at the 10% level.

average, a lower monthly abnormal return of 1.9% in comparison to their size-matched counterparts, when using a five-year issuing window period. Notably, issuing firms showed no evidence of any significant underperformance in comparison to their style-matched counterparts. This result is in line with the results of the previous sections highlighting the ability of the style-matching procedure in diminishing the relative underperformance of issuing firms.

Overall, these robustness tests confirm the earlier findings by further demonstrating the ability of the CAPM in explaining the relative performance of issuing firms and their non-issuing counterparts. When using the recommended style-matching approach, issuing firms show no evidence of significant underperformance in either the equally-weighted or value-weighted approach of measuring share performance. In fact, all abnormal portfolio returns fall between +2% and -2%, and are mainly insignificant, demonstrating that the CAPM does a fairly decent job in predicting the monthly expected returns of these portfolios. Once again, market risk seems to explain enough of the variation in returns across the different firm types.

5.3.3.2 Investor Sentiment and Long-run Share Performance

Table 19 reports the coefficient estimates of the various factor regression models aimed at measuring the effect of investor sentiment on the long-run share performance of issuing firms. The results reported show the use of a three-, four-, and five-year issuing window period to form the monthly portfolios. The focus of this analysis is again on the intercepts. Panel A reports the results of the equally-weighted approach of measuring portfolio performance. The intercepts are all positive, implying that firms experience superior post-issue share abnormal performance when conducting SEOs during periods of high-investor sentiment. However, these findings are only significant when using a five-year issuing window period. Issuing firms that conducted SEOs during periods of high-investor sentiment earned, on average, a higher abnormal return of approximately 2.4% in comparison to firms that conducted SEOs during periods of low-investor sentiment, when using a five-year issuing window period to form the monthly portfolios returns.

Table 19: Investor sentiment and abnormal long-run SEO performance

Panel A: Coefficient estimates (equally-weighted approach)			
	A (intercept)	*B*	#obs.
3 year	0.009	0.058	135
4 year	0.014	0.126	177
5 year	0.024**	0.229*	198
Panel B: Coefficient estimates (value-weighted approach)			
	A (intercept)	*B*	#obs.
3 year	0.053***	0.597***	125
4 year	0.035**	0.479***	168
5 year	0.038***	0.488***	189

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

Panel B reports the results of the value-weighted approach of measuring portfolio performance. In addition to all the intercepts again being positive, they are all significant. For example, issuing firms that conducted SEOs during periods of high-investor sentiment earned, on average, a higher abnormal return of approximately 5.3% relative to firms that conducted SEOs during periods of low-investor sentiment, when using a three-year issuing window period to form the monthly portfolios returns.

Overall, these results contradict both the hypothesised relationship assumed by market timing theories and the results of Chou and Lin (2015), who found that firms issuing during periods of high-investor sentiment experienced more severe post-issue long-run underperformance. In line with earlier findings of this study, there is no evidence in support of the market timing theory's ability to explain long-run SEO share performance.

5.4 Long-run Operating Performance

5.4.1 Operating Performance

5.4.1.1 Year on Year Percentage Changes

Table 20 reports and compares the annual, median percentage change of earnings per shares (EPS) for issuing firms and non-issuing firms for both size-matched, and style-matched

portfolios. For the size-matched portfolios, issuing firms experience significantly worse changes in EPS in comparison to non-issuing firms, in the third and fourth years after the equity issue, although the latter observation is only significant at the 10% level. In relation to the style-matched portfolios, issuing firms experience significant inferior performance in the EPS changes for years two, three and five, although the latter two observations are only significant at the 10% level.

Table 20: Earnings per share (year on year % change)

	Fiscal year relative to issuing					
	-1	1	2	3	4	5
Issuing firms (1)	0.114	0.163	-0.188	-0.202	-0.285	-0.126
Size match (2)	0.138	0.104	0.036	0.175	0.110	0.125
Style match (3)	0.171	0.100	0.122	0.057	0.119	0.126
Difference (1)-(2)	-0.024	0.059	-0.224	-0.377***	-0.395*	-0.251
Difference (1)-(3)	-0.057	0.063	-0.310**	-0.259*	-0.404*	-0.252

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

Overall, these results do show a slight indication of issuing firm underperformance, but with a notable lack of conviction. Despite the lack of compelling evidence pointing toward a clear pattern of relative underperformance, an interesting pattern still emerges. Issuing firms show significant negative median year-on-year percentage changes in year two through to year five following the SEO announcement which is a potential cause of concern considering that the size-, and style-matched firms have a positive median year-on-year percentage change throughout the entire period.

Tables 21 and 22 report and compare the annual, median percentage change of return on assets (ROA) and returns on equity (ROE), respectively, for issuing firms and non-issuing firms for both size-matched, and style-matched portfolios. With exception of the change in ROA in year one, for issuing firms relative to their size-matched counterparts (which is only significant at

the 10% level), there does not appear to be any significant differences in the annual percentage changes in either ROA or ROE, between issuing and non-issuing firms for both the size-matched, and the style-matched portfolios.

Table 21: Return on assets (year on year % change)

	Fiscal year relative to issuing					
	-1	1	2	3	4	5
Issuing firms (1)	-0.077	-0.258	-0.058	-0.102	-0.274	-0.195
Size match (2)	0.008	0.010	-0.077	-0.067	-0.077	-0.049
Style match (3)	-0.089	-0.067	-0.063	0.033	-0.030	-0.047
Difference (1)-(2)	-0.085	-0.268*	0.019	-0.035	-0.197	-0.146
Difference (1)-(3)	0.012	-0.191	0.005	-0.135	-0.244	-0.148

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

Table 22: Return on equity (year on year % change)

	Fiscal year relative to issuing					
	-1	1	2	3	4	5
Issuing firms (1)	-0.182	-0.424	-0.473	-0.437	-0.288	-0.156
Size match (2)	-0.029	-0.129	-0.354	-0.135	-0.214	-0.053
Style match (3)	0.110	-0.272	-0.228	-0.222	-0.142	0.009
Difference (1)-(2)	-0.153	-0.295	-0.119	-0.302	-0.074	-0.103
Difference (1)-(3)	-0.292	-0.152	-0.245	-0.215	-0.146	-0.165

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

In both tables, issuing firms experience negative median year-on-year percentage changes from the year prior to the SEO announcements up until year five after the SEO is announced. These results are less of a concern considering that the size-, and style-matched firms also generally experience these negative annual changes.

Overall, it is interesting to note that the difference in operating performance of issuing firms compared to non-issuing firms in the year before the equity issue is generally negative and consistently insignificant. In contrast to the international evidence in support of the market timing theory, issuing firms do not display superior operating performance prior to issuing equity. Therefore, there is no evidence that managers are attempting to take advantage of any superior, pre-issue operating performance when issuing shares. There is also no clear indication that issuing firms show inferior long-run operating performance relative to non-issuing firms subsequent to the SEO. Even though it appears that in the majority of cases issuing firms experienced an inferior change in the operating performance measures, these differences are generally not significant and do not present any consistent patterns. Furthermore, there does not appear to be any consistent improvement demonstrated by comparing the relative operating performance of issuing firms and their non-issuing counterparts using the style-matching procedure, instead of the simpler size-matching procedure.

5.4.1.2 Cumulative Performance

Table 23 reports the results of the cumulative operating performance as measured by the median of the cumulative year-on-year percentage change. These results represent the cumulative operating performance changes over the given time periods, henceforth referred to as simply the firm's cumulative operating performance.

Table 23: Cumulative operating performance changes

	EPS		ROA		ROE	
	3 years	5 years	3 years	5 years	3 years	5 years
Issuing firms (1)	-0.302	-0.055	-0.228	-0.643	-0.602	-0.661
Size match (2)	0.066	0.313	-0.021	-0.156	-0.209	-0.308
Style match (3)	0.064	0.901	-0.170	-0.113	-0.257	-0.259
Difference (1)-(2)	-0.368	-0.368	-0.207	-0.487	-0.393**	-0.353**
Difference (1)-(3)	-0.366	-0.956**	-0.058	-0.530*	-0.345**	-0.402***

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

Issuing firms demonstrate significant operating underperformance over a five-year period relative to their style-matched counterparts in terms of cumulative EPS performance, but no significant differences are recorded over a three year period. Issuing firms also show no sign of any significant operating underperformance in terms of their cumulative EPS performance in comparison to their size-matched counterparts.

Furthermore, issuing firms do not significantly underperform relative to either their size-matched, or style-matched equivalents when considering the cumulative ROA performance. The one exception is the significant underperformance of SEO firms in comparison to style-matched firms over a five-year period (which is only significant at the 10% level).

Finally, issuing firms significantly underperform in comparison to both size-matched, and style-matched firms over both a three-, and five-year time horizon in terms of their cumulative ROE performance. These results are consistent with the literature documenting the underperformance of issuing firms (Loughran & Ritter, 1997).

Overall, there is mixed evidence on the relative operating performance of issuing firms. Across all three measures of operating performance over three-, and five-year time horizons, issuing

firms do seem to perform worse than both their style-matched, and their size-matched counterparts in terms of the magnitude of the median cumulative annual changes. However, these results lack consistent significance in order to establish a clear pattern. Only the cumulative ROE performance of issuing firms displays robust significance. Ultimately, and in conjunction with the evidence found in Section 5.4.1.1, there is insufficient evidence to credibly conclude that issuing firms display significant operating underperformance.

Ignoring the relative performance and analysing the performance of issuing firms on their own, it is clear that issuing firms do seem to display signs of poor operating performance. A majority of the median annual year-on-year percentage changes in Section 5.4.1.1 are negative for issuing firms. In addition, the median cumulative operating performance of issuing firms (for all three operating performance measures) is negative at both the three-, and five-year horizons. Nonetheless, the findings fail to establish a connection between this poor operating performance and the firm's decision to conduct SEOs considering that: (1) issuing firms generally experienced these negative patterns in the year prior to issuing new shares in the case of the median annual change in ROE and ROA; and (2) issuing firms showed no consistently significant evidence of relative underperformance *vis-à-vis* their non-issuing counterparts.

5.4.2 The Effect of Investor Sentiment on Operating Performance

Table 24 investigates the relationship between investor sentiment and the year-on-year percentage change in the three measures of operating performance. Overall, these results provide no meaningful evidence of any significant impact of investor sentiment on operating performance. This relationship has not been tested in previous studies, as previous literature has focused solely on the effect of investor sentiment on the market performance of issuing firms.

Table 24: Investor sentiment and operating performance

	SEOs during high-sentiment periods (1)	SEOs during low-sentiment periods (2)	Difference (1)-(2)
PANEL A: EPS			
Fiscal year relative to issuing			
1	0.140	0.173	-0.033
2	-0.226	0.071	-0.297
3	-0.084	-0.410	0.326*
4	-0.262	-0.390	0.128
5	0.128	-0.741	0.869*
PANEL B: ROA			
Fiscal year relative to issuing			
1	-0.151	-0.421	0.27
2	-0.076	-0.025	-0.051
3	0.044	-0.384	0.428
4	-0.156	-0.402	0.246
5	-0.303	-0.169	-0.134
PANEL C: ROE			
Fiscal year relative to issuing			
1	-0.303	-0.169	-0.134
2	-0.329	-0.072	-0.257
3	-0.116	-0.519	0.403
4	-0.214	-0.671	0.457
5	-0.154	-0.292	0.138

Note: ***, **, and *, denote that the variable is significantly different from zero at the 1%, 5%, and 10% significance level, respectively.

Although existing literature is yet to comment on the influence of investor sentiment on a firm's operating performance, it makes sense that the operating performance of a firm is not significantly influenced by investor sentiment. A firm's operating performance should be influenced by the firm's managers and insiders, and less so by investor sentiment. It also makes sense that if investor sentiment does not significantly influence the market performance of SEOs, as shown in the previous sections, it would not significantly influence the operating performance of SEOs, as it can also be argued that a firm's market performance is more sensitive to investor sentiment than a firm's operating performance.

Thus, these results are not entirely unexpected and fit in with the earlier findings of this study, with the only significant differences, both only at the 10% significant level, occurring in years 3 and 5 with regards to the annual earnings per share changes. Moreover, these positive differences, implying that issuing firms performed better in these periods, are against the hypothesised relationship between operating performance and investor sentiment that would be in line with the market timing predictions set out in this study.

5.5 Summary of the Results

Analysis of SEO announcement effects provides evidence that is consistent with the adverse selection model pioneered by Myers and Majulf (1984). The market, on average, reacts negatively to SEO announcements with a statistically significant average two-day cumulative abnormal return of -2.6%, following the announcement. The regression analysis further reveals that the market's reaction to the SEO announcement is not significantly influenced by either the firm's size, Tobin's Q-ratio, market-to-book ratio, or the relative size of the equity issue. Similarly, investor sentiment bears no substantial impact on the market's initial reaction to the news that a firm is conducting a SEO.

While issuing firms generally underperform when comparing the equally-weighted buy-and-hold returns and buy-and-hold abnormal market returns, as well as the value-weighted buy-and-hold abnormal market returns, these returns differences seem to be explained by the introduction of market risk into the empirical framework. Issuing firms do not exhibit any significant underperformance when comparing either the equally-weighted, or the value-weighted abnormal buy-and-and hold abnormal realised returns, which are modelled on the CAPM[70]. The attenuating effect on SEO underperformance derived from using a value-weighted approach of measuring share performance, as opposed to an equally-weighted approach, implies that SEO underperformance is more prominent in smaller firms.

[70] These results are confirmed using factor regression analysis.

The analysis of the operating performance of issuing firms reveals no patterns of consistent, significant underperformance. Despite issuing firms underperforming on their cumulative ROE performance, there are no such distinctive results when considering their cumulative EPS and ROA performance. Likewise, analysis of the year-on-year median percentage changes in these three accounting ratios do not signal that issuing firms are significantly underperforming in comparison to non-issuing firms. This does not discount the fact that issuing firms show signs of poor operating performance. However, there does not appear to be any clear link between this poor operating performance and the decision to conduct SEOs.

The overall analysis of the influence of investor sentiment on the performance of SEOs suggests that investor sentiment does not play any consistently significant role in either the short-run or the long-run performance of SEOs, in addition to having no significant influence on a firm's decision to conduct SEOs. In contrast to the predictions put forth by the market timing theory, the factor model regression analysis reveals that investor sentiment actually has a significantly positive influence on the long-run share performance of SEOs in various instances (refer to Table 19).

Overall, these results provide no evidence consistent with the behavioural explanations, particularly those involving market timing considerations that attempt to describe the long-run performances of issuing firms. Instead, the results are consistent with the rational framework whereby any differences in returns between issuing and non-issuing firms are sufficiently explained by the variation in market risk.

6 Conclusion

6.1 The Background

The capital structure decision that firms undertake as they contemplate the choice between financing the firm through debt or equity has attracted much academic attention over the past decade. With the analysis of debt issues producing relatively straight-forward findings, researchers began to focus their efforts on the issuing of equity by listed firms, which soon led to the revelation of fascinating patterns that demanded an explanation. In particular, two well-documented patterns emerged: (1) a negative short-run share price reaction to SEO announcements; and (2) the long-run operating and share price underperformance of issuing firms in comparison to similar non-issuing firms.

While the market's typically negative reaction to SEO announcements appears to be well explained by the adverse selection model developed by Myers and Majluf (1984), the widely-documented poor long-run performance of issuing firms, for periods reaching up to five years after issuance, has been far more difficult to explain. Opinions have been divided on whether there is a rational explanation to this phenomenon or whether the explanation lies within the behavioural intricacies attributed to stock market participants. Despite the importance of these findings and the potential benefits from understanding the market's reaction to SEOs, the topic has until now been widely ignored by the South African literature. As a result, this study set out to explore the short-run and long-run performance of SEOs on the JSE.

6.2 The SEO Decision and the Short-run Effects

Firstly, the initial decision on whether or not a firm conducts a SEO was analysed using regression analysis. The findings reveal that investor sentiment, a firm's prior abnormal returns, and a firm's market-to-book ratio, all bear no significant influence on a firm's decision on whether or not to conduct a SEO. This result casts the first shadow of doubt on the ability of the market timing theory in explaining the performance of SEOs on the JSE. The market timing theory, the popular centre-piece of the behavioural finance theories relevant to SEOs,

hypothesises that managers would attempt to issue equity during periods of high-investor sentiment, when share prices are more likely to experience over-evaluation. Although a firm's prior abnormal share performance and market-to-book ratios, which are other popular proxies of share price misvaluation, should also influence the market timing ability of managers, no such evidence was found.

Secondly, an event study was undertaken in order to investigate issuing firms' short-run share performance subsequent to the SEO announcement. The analysis reveals that the market reaction to SEO announcements is generally negative, with an average two-day cumulative abnormal return of -2.6%. These findings are consistent with the adverse selection model set forth by Myers and Majulf (1984), and are quantitatively and qualitatively similar to the majority of the existing SEO literature[71]. Investors are generally sceptical of a firm's motivation behind the issue of new shares, and therefore react negatively to the SEO announcements. One must also not overlook the dilution effect, which is related to the law of supply. The mere action of increasing the number of shares in issue should also naturally create downward price pressure.

In addition, neither the issuing firm's size, market-to-book ratio, Tobin's Q-ratio, nor the size of the equity issue relative to the issuing firm's size, show any significant influence on the market's reaction to the SEO announcement. These factors do not appear to either alleviate or aggravate the market's generally negative initial reaction to SEO announcements. Further analysis of the short-run share performance of SEOs also reveals that the market's reaction to the announcements is not significantly influenced by investor sentiment. *Ceteris paribus*, it was expected that investors would react less negatively to the SEO announcement during periods of high-investor sentiment, but no such significant benefit was found for firms issuing shares during these periods.

[71] For example, see Ritter (2003).

6.3 The Long-run Effects

Finally, the long-run performance of SEOs was analysed by comparing the share performance and operating performance of issuing firms *vis-à-vis* non-issuing firms. In line with the previous literature, issuing firms severely underperform in comparison to non-issuing firms when examining: (1) the equally-weighted buy-and-hold returns; (2) the equally-weighted buy-and-hold abnormal market returns; and (3) the value-weighted buy-and-hold abnormal market returns. These findings also demonstrate that using a value-weighted approach of measuring share performance, as opposed to an equally-weighted approach, reduces the magnitude, and even the significance of SEO underperformance. This implies that SEO underperformance is more prominent in smaller firms.

In contrast, the analysis of both the equally-weighted, and the value-weighted buy-and-hold abnormal realised returns, which predicts expected returns based on the Capital Asset Pricing Model, reveals no significant differences between the respective performance of issuing and non-issuing firms. Thus, it appears that the differences in the share performance of issuing firms in comparison to non-issuing firms, as discussed in the previous paragraph, is adequately explained by the differences in the market risk between these firms. This supports the rational model framework for explaining the long-run share price performance of issuing firms. These results hold across a one-, three-, and five-year time horizon when matching firms based on the recommended style-matching procedure. Furthermore, these results are robust to the analysis of abnormal share performance using factor regression models.

Although the CAPM has received major criticism over time, market risk (Beta) is adequate enough in explaining the variation of returns between issuing and non-issuing firms, to render the differences in returns between these firms insignificant. Notably, this finding is not a comment on the efficacy of the CAPM in explaining the expected returns of firms listed on the JSE, but an illustration of its ability to sufficiently account for enough variation in the underlying market risk of issuing and non-issuing firms to help explain the differences in the share returns of these firms. The aim of this study does not include making any direct comment on the asset pricing environment in South Africa.

It is also important to consider the influence that matching firms through a style-matching procedure, which controls for both the size and the market-to-book ratio of issuing firms, has in explaining share performance. Use of a style-matching procedure, as opposed to the much simpler size-matching procedure, generally reduces the magnitude of the difference in the share performance of issuing firms relative to non-issuing firms. These findings are unsurprising considering that both the size of a firm, and the firm's market-to-book ratio have famously been documented as important risk factors in explaining the expected returns of shares (Fama & French, 1993). These results also add further support for the use of rational models that explain the long-run performance of SEOs under a risk-return framework.

The analysis of the relative operating performance also revealed no consistently significant differences between the operating performance of issuing and non-issuing firms across the five-year time horizon following the equity issuance, or in the year prior to the SEO. Even though issuing firms experienced poor operating performance subsequent to issuing equity, the operating performance of these firms prior to issuing the equity was also generally poor. Thus, there are no indications that any subsequent poor operating performance experienced by issuing firms was as a consequence of the firm's decision to issue new shares.

Furthermore, after analysing the relationship of investor sentiment and the long-run performance of issuing firms, there appears to be no consistent evidence of any significant relationship. Investor sentiment does not appear to materially influence the long-run share performance or operating performance of issuing firms, casting further doubt on the ability of the market timing theory to explain the long-run performance of SEOs. Only the factor regression models, used as robustness checks, revealed any significant relationship between investor sentiment and the long-run share performance of SEOs, but only in certain instances. In fact, the factor regression analysis revealed a significant, positive relationship between investor sentiment and share performance in certain cases, which completely contradicts the hypothesised relationship set forth by the market timing theories.

Overall, this study does not submit any credible evidence that market-timing considerations are significant in explaining the long-run performance of SEOs, without denying that these considerations may still indirectly influence the short-run performance of SEOs. Even if managers do not attempt to ever benefit from any over-valuations in the share price of their firms, however unlikely that is, investors could still rationally question the motives behind a firm's decision to issue equity. Therefore, investors could still react negatively to SEO announcements, due to their fear that managers may be attempting to time the market (Myers & Majluf, 1984). Although investor sentiment does not appear to influence issuing firms significantly enough to warrant a substantial deviation from the rational predictions of their long-run performance, these findings do not serve to deny the significant influence of investor sentiment on the stock market as a whole.

6.4 The Final Verdict

In summary, the results of this study are inconsistent with the existing literature which argues that the long-run performance of issuing firms signalled an initial underreaction to SEOs buoyed by over-optimistic investors (Loughran & Ritter, 1995). Instead, the long-run performance of issuing firms appears to be adequately explained by the rational models centred on the risk-return framework, implying that investors are reacting swiftly to SEOs in an unbiased fashion. Therefore, there does not appear to be a 'new issues puzzle' in the South African context… and why should there be?

6.5 Potential Avenues for Future Research

This study also brings to light the potential avenues for future research. Particularly, more attention should be focused towards examining the post-issue risk patterns of SEO firms. Due to the ability of the CAPM to adequately explain SEO performance in this study, no other pricing models or risk considerations were examined, leaving room for future exploration. Understanding the repercussions that conducting SEOs has on the risk of the issuing firms in more detail, would further assist managers in making their capital structure decisions. International studies have benefited from dedicating meticulous attention to analysing the risk

of issuing-firms. For instance, Lyandres, Sun and Zhang (2005) proved that issuing-firms tend to have lower liquidity betas, whilst Carlson, Fisher and Giammarino (2006) found that using a dynamic beta approach led to SEO underperformance disappearing. The comprehensive nature of this study resulted in these avenues of research remaining unexplored.

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APPENDIX

1. Logit Regression Models

This section reports the correlation between the four variables used to construct the investor sentiment index and the other explanatory variables used in the Logit regression models.

Table A: Correlation matrix for logit regression models

	Prior 12	***Prior 36***	***future 12***	***future 36***	***M/B***	***NIPO***	***RIPO***	***Turn***	***Prem***
Prior 12	1.000								
Prior 36	0.415	1.000							
future 12	-0.019	-0.037	1.000						
future 36	0.122	0.100	0.453	1.000					
M/B	0.111	0.044	0.019	0.063	1.000				
NIPO	0.016	0.044	0.259	-0.012	0.005	1.000			
RIPO	0.052	-0.117	-0.105	-0.003	0.004	-0.332	1.000		
Turn	-0.030	-0.033	-0.287	0.023	-0.014	-0.938	0.348	1.000	
Prem	0.020	0.024	-0.274	0.033	-0.025	-0.484	-0.370	0.473	1.000

2. Event Study Analysis

This section demonstrates the market's reaction to SEO announcements when measuring the actual return compared to: (1) the share's prior 10 day average; and (2) the share's prior 10 day maximum.

Table B: The stock market's reaction to SEO announcements

	Mean	Median	#Obs.	Std.Dev	Neg. /Pos.
Panel A: Using the share's prior 10 day average as a benchmark					
1-day return	-0.026***	-0.014***	149	0.042	111/27
2-day cumulative return	-0.024***	-0.014***	149	0.090	88/51
Panel B: Using the share's prior 10 day maximum as a benchmark					
1-day return	-0.097***	-0.063***	149	0.042	134/3
2-day cumulative return	-0.165***	-0.101***	149	0.090	132/6

Note: ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

3. Comparing Long-run Share Performance

This section compares the long-run performance of SEO firms *vis-à-vis* their non-issuing counterparts using various robustness measures. These results show that main findings of this study are robust to both (1) the inclusion of the omitted outliers (using both an equally-weighted and a value-weighted approach); and (2) the omission of firms that have conducted multiple announcements in a five-year period. SEO firms do not significantly underperform when comparing the buy-and-hold abnormal returns as predicted by CAPM (rBHARs).

3.1 Equally-weighted Approach (Total Sample)

Table C: Long-run buy and hold returns (BHRs)

	Issuing firms	#Obs.	Non-issuing firms	#Obs.	Difference (1)-(2)
Panel A: Size-match					
1 year	-0.115	47	0.116	47	-0.231**
3 years	0.166	42	0.883	42	-0.717**
5 years	0.184	33	1.766	33	-1.582***
Panel B: Style-match					
1 year	-0.115	47	0.191	47	-0.306***
3 years	0.166	42	1.168	42	-1.002**
5 years	0.184	33	3.222	33	-3.038**

Note: ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

Table D: Long-run Buy and hold abnormal market returns (mBHARs)

	Issuing firms	#Obs.	Non-issuing firms	#Obs.	Difference (1)-(2)
Panel A: Size-match					
1 year	-1.169	47	-0.939	47	-0.230**
3 years	-1.163	42	-0.447	42	-0.716**
5 years	-1.418	33	0.164	33	-1.582***
Panel B: Style-match					
1 year	-1.169	47	-0.863	47	-0.306***
3 years	-1.163	42	-0.162	42	-1.001**
5 years	-1.418	33	1.492	33	-2.910**

Note: ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

Table E: Long-run Buy and hold abnormal realised returns (rBHARs)

	Issuing firms	#Obs.	Non-issuing firms	#Obs.	Difference (1)-(2)
Panel A: Size-match					
1 year	2.143	47	0.284	47	1.859
3 years	0.264	42	1.308	42	-1.044
5 years	1.221	33	3.851	33	-2.630
Panel B: Style-match					
1 year	2.143	47	0.826	47	1.317
3 years	0.264	42	-0.267	42	0.531
5 years	1.221	33	-0.302	33	1.523

Note: ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

3.2 Value-weighted Approach (Total Sample)

Table F: Long-run buy and hold returns (BHRs)

	Issuing firms	#Obs.	Non-issuing firms	#Obs.	Difference (1)-(2)
Panel A: Size-match					
1 year	0.218	74	0.399	74	-0.181
3 years	1.573	65	1.446	65	0.127
5 years	1.517	52	3.421	52	-1.904
Panel B: Style-match					
1 year	0.218	74	0.306	74	-0.088
3 years	1.573	65	5.614	65	-4.041
5 years	1.517	52	15.29	52	-13.773

Note: ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

Table G: Long-run Buy and hold abnormal market returns (mBHARs)

	Issuing firms	#Obs.	Non-issuing firms	#Obs.	Difference (1)-(2)
Panel A: Size-match					
1 year	-1.220	74	-1.037	74	-0.183
3 years	-0.425	65	-0.551	65	0.126
5 years	-1.357	52	0.552	52	-1.909*
Panel B: Style-match					
1 year	-1.220	74	-2.139	74	0.919
3 years	-0.425	65	3.592	65	-4.017
5 years	-1.357	52	12.495	52	-13.852

Note: ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

Table H: Long-run Buy and hold abnormal realised returns (rBHARs)

	Issuing firms	#Obs.	Non-issuing firms	#Obs.	Difference (1)-(2)
Panel A: Size-match					
1 year	6.200	74	0.567	74	5.633
3 years	4.684	65	1.833	65	2.851
5 years	1.853	52	3.702	52	-1.849
Panel B: Style-match					
1 year	6.200	74	0.105	74	6.095
3 years	4.684	65	1.771	65	2.913
5 years	1.853	52	4.463	52	-2.610

Note: ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

3.3 Omitting Firms with Multiple SEO Announcements

Table I: Long-run buy and hold returns (BHRs)

	Issuing firms	#Obs.	Non-issuing firms	#Obs.	Difference (1)-(2)
Panel A: Size-match					
1 year	-0.115	47	0.116	47	-0.231**
3 years	0.166	42	0.883	42	-0.717**
5 years	0.184	33	1.766	33	-1.582***
Panel B: Style-match					
1 year	-0.115	47	0.191	47	-0.306***
3 years	0.166	42	1.168	42	-1.002**
5 years	0.184	33	3.222	33	-3.038**

Note: ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

Table J: Long-run Buy and hold abnormal market returns (mBHARs)

	Issuing firms	#Obs.	Non-issuing firms	#Obs.	Difference (1)-(2)
Panel A: Size-match					
1 year	-1.169	47	-0.939	47	-0.230**
3 years	-1.163	42	-0.447	42	-0.716**
5 years	-1.418	33	0.164	33	-1.582***
Panel B: Style-match					
1 year	-1.169	47	-0.863	47	-0.306***
3 years	-1.163	42	-0.162	42	-1.001**
5 years	-1.418	33	1.492	33	-2.910**

Note: ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

Table K: Long-run Buy and hold abnormal realised returns (rBHARs)

	Issuing firms	#Obs.	Non-issuing firms	#Obs.	Difference (1)-(2)
Panel A: Size-match					
1 year	2.143	47	0.284	47	1.859
3 years	0.264	42	1.308	42	-1.044
5 years	1.221	33	3.851	33	-2.630
Panel B: Style-match					
1 year	2.143	47	0.826	47	1.317
3 years	0.264	42	-0.267	42	0.531
5 years	1.221	33	-0.302	33	1.523

Note: ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

4. Investor Sentiment and Long-run Share Performance

This section confirms the main findings of this study, which fails to demonstrate any consistent evidence that investor sentiment influences the long-run share performance of issuing firms. This results holds for: (1) the inclusion or exclusion of outliers in both the equally-weighted and the value-weighted approach; (2) the relative performance of issuing firms *vis-à-vis* their size-, and style-matched counterparts.

4.1 Equally-weighted (Total Sample)

Table L: Investor sentiment and long-run share performance

	SEOs during high-sentiment periods (1)	SEOs during low-sentiment periods (2)	Difference (1)-(2)
Panel A: BHRs			
1 year	0.013	-0.003	0.016
3 years	-0.122	0.389	-0.511*
5 years	0.569	-0.126	0.695*
Panel B: BHARs (relative to market returns)			
1 year	-0.985	-1.173	0.188
3 years	-1.277	-1.206	-0.071
5 years	-1.086	-1.774	0.688*
Panel C: BHARs (relative to expected returns)			
1 year	2.791	3.921	-1.130
3 years	1.952	-0.013	1.965
5 years	1.929	-0.833	2.762

Note: ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

4.2 Value-weighted (Total Sample)

Table M: Investor sentiment and long-run share performance

	SEOs during high-sentiment periods (1)	SEOs during low-sentiment periods (2)	Difference (1)-(2)
Panel A: BHRs			
1 year	0.382	-0.037	0.419
3 years	2.863	-0.362	3.225
5 years	2.182	0.262	1.920
Panel B: BHARs (relative to market returns)			
1 year	-1.243	-1.183	-0.06
3 years	0.577	-1.928	2.505
5 years	-1.031	-1.972	0.941**
Panel C: BHARs (relative to expected returns)			
1 year	1.335	13.750	-12.415
3 years	7.179	0.942	6.237
5 years	3.215	-0.718	3.933

Note: ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

4.3 Value-weighted (Omitting Outliers)

Table N: Investor sentiment and long-run share performance

	SEOs during high-sentiment periods (1)	SEOs during low-sentiment periods (2)	Difference (1)-(2)
Panel A: BHRs			
1 year	-0.983	-0.987	0.004
3 years	-0.983	-0.996	0.013
5 years	-0.973	-0.978	0.005
Panel B: BHARs (relative to market returns)			
1 year	-1.000	-1.001	0.001
3 years	-1.001	-1.003	0.002
5 years	-1.003	-1.009	0.006
Panel C: BHARs (relative to expected returns)			
1 year	-0.960	-0.987	0.027
3 years	-0.980	-0.982	0.002
5 years	-0.990	-0.998	0.008

Note: ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

4.4 Relative Performance

Table O: Investor sentiment and long-run performance relative to size-matched firms

	During high-sentiment periods (1)	During low-sentiment periods (2)	Difference (1)-(2)
Panel A: BHRs			
1 year	-0.941	-1.497	0.556**
3 years	-1.603	-2.280	0.677
5 years	-1.982	-3.538	1.556**
Panel B: BHARs (relative to market returns)			
1 year	-0.941	-1.497	0.556**
3 years	-1.603	-2.28	0.677
5 years	-1.982	-3.538	1.556**
Panel C: BHARs (relative to expected returns)			
1 year	-0.349	2.604	-2.953
3 years	0.353	-2.130	2.483
5 years	-0.910	-5.521	4.611

Note: ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

Table P: Investor sentiment and long-run performance relative to style-matched firms

	During high-sentiment periods (1)	During low-sentiment periods (2)	Difference (1)-(2)
Panel A: BHRs			
1 year	-1.219	-1.200	-0.019
3 years	-2.765	-1.328	-1.437**
5 years	-4.704	-2.313	-2.391*
Panel B: BHARs (relative to market returns)			
1 year	-1.219	-1.2	-0.019
3 years	-2.765	-1.328	-1.437**
5 years	-4.704	-2.313	-2.391*
Panel C: BHARs (relative to expected returns)			
1 year	-0.543	3.077	-3.620
3 years	-6.222	-0.913	-5.309
5 years	-6.374	-1.380	-4.994

Note: ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.